Comments to the
Federal Communications Commission
on
"A National Broadband Plan for Our Future"
GN Docket No. 09-51

Submitted by

ZeroDivide

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ZeroDivide
425 Bush Street ,Suite 300
San Francisco, CA 94108
Contact: Laura Efurd
Chief Community Investment Officer
415-773-0388
Laura@zerodivide.org

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I. EXECUTIVE SUMMARY

ZeroDivide is a 501(c)(3) public foundation that has invested more than $45 million over the past 10 years in innovative programs that encourage sustainable adoption of broadband services in unserved and underserved communities. ZeroDivide provides financial support, capacity building and technical assistance to nonprofit organizations that benefit low-income, minority, immigrant, non-English speaking, LGBT, aged and disability communities. Our key comments and recommendations to the Federal Communications Commission regarding the development of a National Broadband Plan are:

Community Engagement:

- The Commission should conduct significant outreach to unserved and underserved communities in developing the National Broadband Plan.
- Supporting community institutions is critical in providing broadband access, creating broadband demand, and creating economic, educational and civic engagement opportunities through broadband.

The Market and Affordability:

- The issue of price and marketplace competition should be a key consideration in the Commission's plan. Unserved and underserved communities should be a priority in the national plan.
- Market failure has occurred in certain communities because the product is not affordable and/or applications and content are not relevant to the community.
- Affordability is a determinant of access for low-income and other underserved communities.
- The goals of Affordability and Maximum Utilization are linked, however, affordability is not the only issue which drives adoption(and maximum utilization) in underserved communities.

Demand and Adoption in Unserved and Underserved Communities

- The Commission should consider programs which provide broadband subsidies for low-income communities and create low-cost community based broadband services.
- Broadband adoption and demand strategies must be included in a National Broadband Plan to assure maximum utilization.
- Technology adoption programs in unserved and underserved communities work best when tied to other community outcomes such as civic participation, community development, health care delivery, education, worker training, entrepreneurial activity, job creation, and economic growth.

Broadband Mapping and Data:

- The Commission should develop a system for collecting data on availability of broadband as well as the broadband adoption.
- The broadband mapping effort should include the mapping and tracking of broadband adoption, in addition to broadband availability.

Accessibility for Individuals with Disabilities:

- The Broadband Plan must promote the concept of universal design in broadband networks and application in order to assure that individuals with disabilities can fully access and benefit from broadband.

These recommendations are based upon our lessons learned over the past decade and focus largely on broadband adoption, demand, training, education and job creation in unserved and underserved communities.

II. DISCUSSION

In this section, ZeroDivide offers its comments in response to the Federal Communications Commission Notice of Inquiry released April 8, 2009 GN Docket Number 09-51. Note: The section and paragraph numbers indicated below coincide with those reflected in the Notice of Inquiry.

A. Approach to Developing the National Broadband Plan

12. The Commission should conduct significant outreach to unserved and underserved communities in developing the National Broadband Plan.

In order to hear directly from the unserved and underserved communities that will benefit most from a national plan to "ensure that all people of the United States have access to broadband capability," the Commission must conduct significant outreach to these communities during the development of this plan. While some organizations representing these communities, like ZeroDivide, will participate in this proceeding, the fact is the voice of the very people we seek to help will not be at the table if the Commission relies on a typical regulatory proceeding. The Commission would be able to gather invaluable knowledge about specific community needs and solutions by engaging with communities directly. Specific activities could include:

- Public hearings throughout the country
- Site visits to effective broadband access and adoption programs
- Roundtables with organizations serving these communities

B. Establishing Goals and Benchmarks

2. Defining Access to Broadband

23. Supporting community institutions is critical in providing broadband access, creating broadband demand, and creating economic, educational and civic engagement opportunities through broadband.

The goal of a National Broadband Plan should be the availability of affordable broadband to every household in the country. However the Commission should also look at broadband capabilities at community institutions such as schools, libraries, small businesses, health clinics, and community-based organizations. These community institutions provide critical access to broadband services for individuals who may not have access at home. Libraries and community-based organizations still serve as the major access point to the internet in many communities. In addition, community institutions need access to broadband and broadband applications to effectively deliver services and address needs in the community.

In measuring broadband access and capabilities, the Commission should include measures of these key community institutions and organizations. Their level of broadband access, capacity and use of broadband application is a direct reflection of the overall level of broadband access and capacity in the community.

25. The issue of price and marketplace competition should be a key consideration in the Commission's plan. Unserved and underserved communities should be a priority in the national plan.

The issues of price and marketplace competition are integrally linked to access to affordable broadband services. A more competitive market will provide greater consumer choice, help keep prices affordable, and promote customer service as well as create other ways for companies to distinguish their service.

Those communities with no broadband access (unserved) should be a priority in the National Broadband Plan. However, underserved communities that may not be able to take advantage of broadband provided in their community because they cannot afford it, or experience other barriers to broadband adoption should also be prioritized. Whether one is an inner-city resident who cannot afford the broadband service provided in his/her community or a resident of a rural area with no broadband service, the result is the same – no access to broadband. The barriers to broadband access and adoption are just as real to underserved communities as they are to unserved communities.

This "digital divide" is a technological manifestation of economic, cultural and political divides. Underserved communities appear in both rural and urban settings and include low-income, minority, immigrant, non or limited–English speaking, LGBT, aged and disability communities.

Underserved also refers to populations for which there exist barriers to broadband assimilation that can be effectively removed by implementation of demand/adoption programs. These barriers include: race, ethnicity, language, physical capacity, economic conditions, and geography.

For the purposes of broadband demand and adoption programs, the term *underserved* should be defined as geographic areas or population groups which meet one or more of the following criteria:

- Broadband access and adoption rates fall below the rates of the general population (less than 55%[1]);
- A low-income population as determined by state or federal guidelines, such as residents of low-income housing, or an area with a high rate of participation in free and reduced price lunch/breakfast program;
- The cost of broadband services is out of reach for the targeted population; or

[1] Pew Internet and American Life Project http://www.pewinternet.org/Reports/2008/Home-Broadband-2008.aspx

- The target population or geographic area has one or more demonstrated barriers to adoption including, race, ethnicity, language, physical capacity, economic conditions, and geography.

In order to assure that data on these barriers is collected and their impact measured consistently, we also recommend that the Decennial Census and the American Community Survey include regular collection of such demographic characteristics such as race/ethnicity, language, physical ability, income, and education data related to broadband adoption.

27. Affordability is a determinant of access for low-income and other underserved communities.

Low-income households have among the lowest rate of broadband adoption and cite high costs of service as a barrier to access.[2] Even though broadband services may be fully deployed in a geographic area, if residents cannot afford the price point offered, broadband will still be inaccessible. Therefore, the Commission should consider support for three types of programs which can reduce costs and provide affordable broadband to low-income communities in such a region:

- Deploy municipal or community-based networks;
- Increase capacity of community-based organizations to serve as access points in the community; and
- Provide a subsidy to low-income individuals.

More details on the issues of affordability are discussed in our response to questions posed under Section D: Affordability and Maximum Utilization, including examples of successful programs which address the issue of affordability.

28. The Broadband Plan must promote the concept of universal design in broadband networks and application in order to assure that individuals with disabilities can fully access and benefit from broadband.

A robust broadband infrastructure provides significant opportunities for new applications to increase access for individuals with disabilities to a host of information and services via the internet.[3] However, many web sites, broadband applications and computer equipment are not accessible to individuals with disabilities. The concept of universal design promotes the design of products, services and applications that are accessible to all regardless of their disability.

[2] Pew Internet and American Life Project http://www.pewinternet.org/Reports/2008/Home-Broadband-2008.aspx

[3] For more information on how broadband impacts the lives of Children with Disabilities see *Helping Our Children With Disabilities Succeed: What's Broadband Got To Do With It?*, The Children's Partnership, July 2007 http://www.childrenspartnership.org/AM/Template.cfm?Section=Home&CONTENTID=11344&TEMPLATE=/CM/ContentDisplay.cfm

In addition, the National Broadband Plan should include a plan for more in-depth study into the broadband adoption and adoption barriers to individuals with disabilities. Current research surveys which measure broadband adoption rarely include meaningful information about broadband adoption among individuals with disabilities.

Broadband adoption in this community, like other underserved communities, requires not only access to affordable broadband services but also relevant content and applications. One successful program supported by ZeroDivide is Bookshare™, the world's largest accessible digital library of scanned material for people with vision and reading disabilities. http://www.benetech.org/

3. Measuring Progress

29. The Commission should develop a system for collecting data on availability of broadband as well as the broadband adoption.

The Organization for Economic Cooperation and Development (OECD) measures adoption or subscription rates rather than availability in ranking broadband penetration in OECD countries. In addition, the OECD tracks usage rates, recognizing that improving adoption is critical in assuring that the broadband infrastructure is useful and results in improved economic, educational, social, and health conditions among users.[4]

For example, broadband adoption program metrics should include:

- Increased broadband adoption rates in geography/population served.
- Increased level of technology skills of participants in the program.
- Revenue stream or diversified funding model from marketing and distributing products or services to unreached consumers.
- Measurable outcomes in terms of educational attainment or job readiness.
- A track record of success in creating community of learning models and practices.
- Economic capacity and asset growth in depressed economic areas as evidenced by:
  - Attraction of growth capital by nonprofit organizations and small businesses
  - Homegrown jobs created in the community
  - Employment of residents by broadband technology enabled enterprises

D. Affordability and Maximum Utilization

52. The goals of Affordability and Maximum Utilization are linked. However, affordability is not the only issue which drives adoption(and maximum utilization) in underserved communities.

[4] OECD Broadband Portal: http://www.oecd.org/sti/ict/broadband

1. Affordability

54. The Commission should consider programs which provide broadband subsidies for low-income communities and create low-cost community based broadband services.

The cost of broadband subscription services and the necessary corresponding hardware and software continues to be a major barrier for low-income and other underserved communities. The cost of 1Mbps broadband service costs a household from $325 to $870 per year plus an additional $500 for a computer and software.[5] In addition, a household may have to factor in costs of training and technical support. For a household making $20,000 or less per year, this is a significant addition to the annual household budget.

Low-income households continue to have the lowest rates of broadband adoption as documented by The Pew Internet and the American Life Project[6] as well as supported by other studies including an annual statewide survey in California conducted by the Public Policy Institute of California (PPIC) and funded by ZeroDivide, *Californians and Information Technology*. These studies also point to cost as an issue to technology and broadband adoption. The Pew study found that 35% of dial-up users said that the price of broadband would have to fall before they would utilize this service. The PPIC study also found that cost is the main reason that adults in California do not have a computer in the home (37%). Additionally, 21 percent said they did not have a computer because they did not know how to use one.[7]

Over the last 10 years, ZeroDivide has supported a number of programs to increase technology adoption in low-income and underserved communities. We have employed two major strategies to address the affordability issue:

1. Create low-cost or free broadband services in unserved and underserved communities, primarily through the deployment of community wireless networks:

   Little Tokyo Unplugged is a community wireless network that provides Wi-Fi Internet services to local residents, visitors, small businesses, and the nonprofit community. Little Tokyo Unplugged contributes to economic development of the Little Tokyo area of Los Angeles, helps promote the community's culture and history, and provides broadband access for low-income residents. http://www.littletokyounplugged.org

[5] Based on comparison of sample costs of broadband subscriptions by technology type. Comparison chart included in appendix.

[6] Pew Internet and the American Life Project. *Home Broadband Adoption 2008.* July 2008 http://www.pewinternet.org/Reports/2008/Home-Broadband-2008.aspx

[7] Public Policy Institute of California. *Californians and Information Technology*. June 2008 http://www.ppic.org/main/publication.asp?i=834

Tribal Digital Village provides broadband internet service in rural Tribal communities that currently do not have service. http://www.sctdv.net/

2. Support community-based organizations as key access points for low-income and other underserved communities:

Self Help for the Elderly provides technological education and curriculum tailored to the cultural needs of the aged. Courses are taught year-round by instructors that provide small group classes in English, Cantonese and Mandarin. http://www.selfhelpelderly.org/services_computer.php

Central American Resource Center provides no-fee after school programs for youth, focusing on technology education, interdisciplinary art, literacy and youth leadership. To foster communication, the organization hosts family integration nights and sponsors an inter-ethnic youth leadership development program. http://www.carecen-la.org/

These programs have been tremendously successful in increasing broadband access in underserved communities in the home and through community access points. A National Broadband Plan must consider ways to replicate and scale such programs that address cost and other barriers to specific underserved communities. The sections of the Broadband Technologies Opportunities Program (BTOP) which establish funding for Innovative Broadband Adoption programs and Public Computing Centers is a good start.

In addition, to scale home-based broadband adoption, the Commission should support and/or implement programs that would subsidize recurring subscription costs for broadband services and fixed costs of obtaining computer equipment. The Universal Service program should be revised to subsidize broadband for low-income individuals under the Lifeline and Link-Up program.

2. Maximum Utilization

55-57. Broadband adoption and demand strategies must be included in a National Broadband Plan to assure maximum utilization.

The National Broadband Plan must include strategies for creating demand for and adoption of broadband in both unserved and underserved communities. Broadband adoption data shows that, even when affordable broadband is available subscription rates are not as high in underserved communities.

While access and affordability are key issues driving broadband adoption in unserved and underserved communities, ZeroDivide has learned that barriers to adoption are complex, vary among different populations, and cannot always be resolved with a one-size fits all approach. Other key issues include relevant online content and applications, language barriers, training and technical support needs, privacy and security concerns.

ZeroDivide recently completed a study of five of its community wireless broadband projects in various underserved communities in California, which provides interesting data for the Commission to consider in understanding broadband adoption in underserved communities. All five projects included deployment of a wireless network, consumer education and outreach, technology training and computer access programs. Four of the five projects were in underserved communities in which broadband service was available, but residents could not afford the service. In one case, the project was in an unserved community on rural Tribal lands. The study found that the availability of computer equipment and training, and community outreach and education about the importance of technology adoption were critical to the success of each project. In addition, the study revealed that broadband access alone would not have been great enough of an incentive for adoption. In order to achieve broadband adoption, significant effort and resources had to be devoted to outreach and education. [8]

In our experience with various technology adoption programs, key elements to a broadband adoption program include:

- Leadership:
  Building leadership in unserved and underserved communities that understand the value of technology, such as broadband and its applications has been a key driver in technology adoption in underserved communities. These leaders serve as the "translators" for the community in conducting outreach and education campaigns. They are thought leaders who help transform community technology needs into policy initiatives, and entrepreneurs who develop new ideas to more effectively use technology in their communities to improve economic, educational and social conditions. Through the ZeroDivide Fellows program, we have built a network of 45 diverse community leaders who promote broadband technology adoption in the most underserved communities in California.
  http://www.zerodivide.org/initiatives/leadership

- Relevant content and applications:
  Underserved communities must see the relevance of broadband to their lives in order to make the necessary changes in their lives to overcome barriers to broadband such as cost, training, and investment in computer equipment. ZeroDivide programs have demonstrated that when individuals begin to experience how broadband can connect them to information and services, improve educational opportunities, help find jobs, access better health care, provide content in their own language, and provide content about their local communities, adoption of this technology occurs. In addition, broadband becomes highly desired in households with new users, particularly youth, who have the opportunity to create their own content such as videos, podcasts, and blogs, and interact with peers online through social networks.

[8] ZeroDivide Community WiFi Study, Review Draft, Tina Lee, May 2009, pgs. 12,18

- Community outreach/community-based organizations:
  Broadband adoption programs succeed when they are tied to community organizations and institutions which have already gained the trust of the target populations. These organizations understand the issues and perspective of their community members. They are able to conduct culturally competent outreach and education and more effectively reduce barriers to broadband adoption. In many underserved communities, such as immigrant communities and communities of color, trust is a significant factor in technology adoption.

- Programs which address targeted populations and their specific barriers to broadband adoption
  As stated earlier, barriers to adoption are complex and vary among different populations, and therefore cannot always be resolved with a one-size fits all approach. ZeroDivide has invested in the following organizations that demonstrate that focused approaches targeted to distinct populations can have significant impact within their communities:

  CAMINOS enables low-income, Latina immigrants to create economic opportunities and self improvement through access to technology.
  http://www.caminossf.org

  FresYES is a workforce skills development initiative of the Center for Multicultural Cooperation in the rural central valley of California. This enterprise responds to the public's need for reasonably priced reliable technical assistance by training and employing disadvantaged youth.
  Http://cmcweb.org/content/view/29/29/

  Familia Unida Living with Multiple Sclerosis supports technology access and training for Spanish-, Japanese-, Chinese- and English-speaking populations living with multiple sclerosis.
  http://www.msfamiliaunida.org/

- Sustainability:
  ZeroDivide was established at the pinnacle of digital divide funding in the late 1990's, however since then funding for technology adoption in undeserved communities has dramatically fallen due to the dotcom bust in the early 2000's and reduced federal support for community technology programs. We remain one of the few funders dedicated to supporting technology in underserved communities. This has led us to focus on building sustainability strategies within technology adoption programs through social enterprise.

  Technology provides a unique opportunity for underserved communities to produce valuable products and services in the marketplace. ZeroDivide currently invests in social enterprises which focus on broadband access, technology training and content production, and have developed an earned income strategy to support overall operations and social outcomes of increased economic opportunities and/or civic engagement. Some examples of these social enterprises include:

Change Agent Productions is a social enterprise of the YMCA Long Beach Youth Institute comprised of professional digital media artists who work alongside urban youth from low-income communities to produce professional video productions, graphic design projects and digital media trainings. http://changeagentproductions.org/, http://www.lbymcayi.org/

ReliaTech is a social enterprise of the Stride Center that provides computer service and support by training and employing individuals from low-income communities. ReliaTech also refurbishes computers for low-income individuals, schools, churches, senior centers and other nonprofit organizations. http://www.reliatech.org/, http://stridecenter.org/

E. Status of Deployment

2. Subscribership Data and Mapping

61. The broadband mapping effort should include the mapping and tracking of broadband adoption, in addition to broadband availability.

Currently, no quality public data tracks broadband adoption by census tract or zip code. Adoption rates need to be mapped in order for the FCC, NTIA, RUS, other agencies, and the general public to understand more clearly the issues associated with adoption and to measure the success of adoption in unserved and underserved communities.

Such data should be consistent with new mapping tools such as Google maps to allow researchers and others to compare adoption data with socio-economic data. ZeroDivide supported such an effort in California entitled *In Search of Digital Equity: Assessing the Geography of the Digital Divide in California* conducted by the Pat Brown Institute at the California State University – Los Angeles.

http://www.scribd.com/doc/11233703/In-Search-of-Digital-Equity

F. Specific Policy Goals of the National Broadband Plan

63. Technology adoption programs in unserved and underserved communities work best when tied to other community outcomes in such areas as civic participation, community development, health care delivery, education, worker training, entrepreneurial activity, job creation and economic growth.

The following list provides examples of how investment in technology adoption in underserved communities can also achieve specific policy goals outlined in the National Broadband Plan.

2. Civic Participation

Filipinos for Affirmative Action utilizes social media and new technology tools to increase voter participation and civic engagement of Filipinos in California and the nation. They conduct voter mobilization, data collection and analysis, and engage Filipinos in the development of positive social policy aimed at defending and expanding the rights of immigrants. FAA's mission is to build a strong and empowered Filipino community by organizing constituents, developing leaders, providing services, and advocating for policies that promote social and economic justice and equity. http://www.filipinos4action.org/index.htm

Hispanas Organized for Political Equality (HOPE) works to provide a critical voice to Latinas to develop their personal growth, prosperity, and political clout through innovative advocacy, education and leadership strategies and programs. With its HOPE.ACT.VOTE campaign, HOPE is utilizing an interactive advocacy web-portal aimed at mobilizing California's 1.6 million Latina registered voters. HOPE is utilizing a variety of web-based advocacy tools to increase the number of informed Latina voters, motivate them to become politically active and advocate on behalf of HOPE's policy agenda, and increase the number of Latinas directly communicating with policymakers to impact state policy. http://www.latinas.org/site/c.qwL6KiNYLtH/b.2247283/

Youth Radio trains young people from under-resourced public schools, community-based organizations, group homes and juvenile detention centers to produce and distribute award-winning media productions via cutting-edge technology. http://www.youthradio.org/

Youth Outlook,(YO!) produces and distributes youth media content locally and nationally to influence opinions and move policies. YO! is the umbrella organization that houses YO!TV, YO!Radio, and four magazines (Debug, The Beat Within, SNAG, SPRAWL). YO! also podcasts and streams youth content directly from its website, www.youthoutlook.org. YO! trains and employs youth ages 14-25 in all aspects of its programs. http://www.youthoutlook.org/

Just Think teaches young people media literacy skills for the 21st century. They have created and delivered in-school, after-school and online media arts and technology education locally, nationally, and internationally for thirteen years. In the past four years their programs have impacted over 2000 students nationwide. Just Think's enterprise earns revenues through training teachers to use key concepts of media literacy and selling their innovative curricula online. http://www.justthink.org/

4. Community Development

Little Tokyo Unplugged is a community wireless network that provides Wi-Fi Internet services to local residents, visitors, small businesses, and the nonprofit community. Little Tokyo Unplugged contributes to economic development of the Little Tokyo area of Los Angeles, helps promote the community's culture and history, and provides broadband access for low-income residents. http://www.littletokyounplugged.org

5. Health Care Delivery

Health Access established a project with Alameda County Medical Center (ACMC) and San Francisco General Hospital (SFGH) to ensure systematic, high-quality, and quick delivery of interpreter services between patients and doctors. The Video Medical Interpretation System (VMI) provides translations for about 22 different languages. Since the inception of this project, wait times for patients who need interpreter services have shrunk from an average of 30 minutes to shorter than five minutes. Interpreter services have moved beyond the hospitals and now include community health centers. Each county records more than 100,000 interpretations a year - the majority of which are performed either telephonically or via video-conferencing equipment.
http://www.health-access.org/item.asp?id=159

7. Education

Benetech uses technology innovation and business expertise to solve unmet social needs. They created Bookshare™, the world's largest accessible digital library of scanned material for people with vision and reading disabilities.
http://www.benetech.org/

Change Agent Productions is a social enterprise of the YMCA Long Beach Youth Institute comprised of professional digital media artists who work alongside urban youth from low-income communities to produce professional video productions, graphic design projects and digital media trainings.
http://changeagentproductions.org/, http://www.lbymcayi.org/

8. Worker Training

Bay Area Video Coalition (BAVC) is a nonprofit media arts center launched in 1976 as a way to make emerging video technology accessible to independent mediamakers. BAVC's enterprise utilizes a high-speed fiber network to transform their in-person technology training programs to an offline format, expanding the market base for these state-of-the art training services as a profitable online enterprise. http://www.bavc.org

Women's Audio Mission (WAM) is a women-run, nonprofit organization dedicated to the advancement of women in the recording arts. In a field where women are historically underrepresented, WAM seeks to create an

environment that will encourage and enable the aspirations of women in the recording arts. WAM uses video technology to produce on-demand learning units, live and interactive lectures, and member meetings to reach low-income women throughout California. It takes advantage of social media and video streaming technology as a means of delivering educational content. http://www.womensaudiomission.org

10. Entrepreneurial Activity

EPA.net works with low-income youth to create web and video products for paying clients. Youth participate in leadership roles within the business to expand the client base.
http://www.epa.net/

San Diego Futures Foundation works to establish accessibility to information technology resources, increase computer literacy, and provide training to enable a broader range of citizens to cross the digital divide. The WhizKidz venture trains at-risk young adults (18-24 yrs old) to develop marketable technical, entrepreneurial, and business skills while teaching small business owners in the San Diego City Heights area to leverage technology to improve productivity and increase revenue.
www.sdfutures.org

11. Job Creation and Economic Growth

ReliaTech is a social enterprise of the Stride Center that provides computer service and support by training and employing individuals from low-income communities. ReliaTech also refurbishes computers for low-income individuals, schools, churches, senior centers and other nonprofit organizations. http://www.reliatech.org/, http://stridecenter.org/

MicroMentor provides emerging entrepreneurs from low-income communites with convenient and affordable access to trusted business mentoring, current industry information, and personalized advice via a web-based social network application. MicroMentor's mission is to build businesses that increase economic activity and employment opportunities in low and moderate-income communities.

III. CONCLUSION

ZeroDivide is pleased to participate in this proceeding and share the knowledge and experience we have gained over the last 10 years in supporting and investing in technology adoption in underserved communities. We appreciate the Commission's thorough and thoughtful questions, particularly as they relate to the unserved and underserved communities we have worked with over the last decade.

Our comments and recommendations in this document are based on our experience and reflect our key lessons learned regarding technology adoption (including broadband adoption) in unserved and underserved communities including:

- Investment must be made in both the deployment of technology and adoption and demand creation strategies;
- Adoption and demand strategies must be tied to other community outcomes that are relevant to the target population or community;
- Solutions must come from and involve the communities that are the intended beneficiaries;
- Successful technology adoption requires target programs that address the specific barriers to adoption for a specific population;
- Community outreach and connections with trusted community organizations is required;
- Building local community leadership to promote and utilize technology helps to achieve and sustain technology adoption;
- Technology applications and services can help create sustainable community organizations and businesses;
- Technology adoption in unserved and underserved communities fosters economic and educational opportunities, jobs, civic engagement, and health and well-being in these communities.

We look forward to the continuing to provide additional thoughts and comments through the reply comments process.

ZeroDivide
425 Bush Street, Suite 300
San Francisco, CA 94108
Contact: Laura Efurd
Chief Community Investment Officer
415-773-0388
Laura@zerodivide.org

IV. APPENDIX

1. ZeroDivide Sample Broadband Estimated Cost Chart
2. ZeroDivide WiFi Study, Review Draft, Tina Lee, May 2009
3. Public Policy Institute of California Statewide Survey: Californians and Information Technology, June 2008
4. Pat Brown Institute of Public Affairs Policy Brief: In Search of Digital Equity: Assessing the Geography of Digital Divide in California, Issue Brief No. 5, December 2008

SAMPLE ESTIMATED COSTS FOR BROADBAND ACCESS			
Hardware sample estimated costs: (e.g. Netbook/Laptop/etc. + software + modem/cabling/etc.)			$ 500
Dial-Up High-Speed Internet	56Kbps	Connectivity – 2 yrs	$ 492
		Estimated cost per 100 users	$ 49,200
		Estimated cost per 500 users	$ 246,000
DSL	1.0/1.5Mbps	Connectivity – 2 yrs	$ 647
		Estimated cost per 100 users	$ 64,700
		Estimated cost per 500 users	$ 323,500
	6.0-7.1Mbps	Connectivity – 2 yrs	$ 915
		Estimated cost per 100 users	$ 91,500
		Estimated cost per 500 users	$ 457,500
Cable High-Speed Internet	12Mbps	Connectivity – 2 yrs	$ 894
		Estimated cost per 100 users	$ 89,400
		Estimated cost per 500 users	$ 447,000
	16Mbps	Connectivity – 2 yrs	$ 1,272
		Estimated cost per 100 users	$ 127,200
		Estimated cost per 500 users	$ 636,000
Mobile Broadband (Wireless)	250MB	Connectivity – 2 yrs	$ 995
		Estimated cost per 100 users	$ 99,500
		Estimated cost per 500 users	$ 497,500
	5GB	Connectivity – 2 yrs	$ 1,475
		Estimated cost per 100 users	$ 147,500
		Estimated cost per 500 users	$ 737,500
Fiber Optics	Download 10Mbps Upload 2Mbps	Connectivity – 2 yrs	$ 1,080
		Estimated cost per 100 users	$ 108,000
		Estimated cost per 500 users	$ 540,000
	Download 20Mbps Upload 5Mbps	Connectivity – 2 yrs	$ 1,320
		Estimated cost per 100 users	$ 132,000
		Estimated cost per 500 users	$ 600,000
	Download 20Mbps Upload 20Mbps	Connectivity – 2 yrs	$ 1,560
		Estimated cost per 100 users	$ 156,000
		Estimated cost per 500 users	$ 780,000
Satellite	Download 1.0Mbps Upload 128Kbps	Connectivity – 2 yrs	$ 1,740
		Estimated cost per 100 users	$ 174,000
		Estimated cost per 500 users	$ 870,000
	Download 1.2Mbps Upload 200Kbps	Connectivity – 2 yrs	$ 1,980
		Estimated cost per 100 users	$ 198,000
		Estimated cost per 500 users	$ 990,000
	Download 1.6Mbps Upload 250Kbps	Connectivity – 2 yrs	$ 2,220
		Estimated cost per 100 users	$ 222,000
		Estimated cost per 500 users	$1,110,000
	Download 2.0Mbps Upload 300Kbps	Connectivity – 2 yrs	$ 3,180
		Estimated cost per 100 users	$ 318,000
		Estimated cost per 500 users	$1,590,000
	Download 3.0Mbps Upload 300Kbps	Connectivity – 2 yrs	$ 4,860
		Estimated cost per 100 users	$ 486,000
		Estimated cost per 500 users	$2,430,000

Note: Prices reflected are as publicized online by major Broadband Providers. Most rates assume a "package" e.g. internet service along with phone service or existing customer with company. Taxes and other associated costs not included.

This comparative chart was compiled by ZeroDivide in June 2009.

ZeroDivide

Community WiFi Study

May 2009

Tina Lee
Author

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INTRODUCTION

Broadband infrastructure is an essential and basic component of today's global economy. In the United States alone, it is estimated that every $1 invested in broadband infrastructure yields almost $3 in return,[1] and every 1% increase in broadband penetration is projected to add nearly 300,000 jobs.[2] Content rich and interactive websites for news, health, education and government services demanding bandwidth afforded only by high-speed networks have also created innumerable social benefits, including increased civic engagement and improved delivery of government services for social welfare, public safety and disaster relief. Yet with only 61% of U.S. households currently connected to a high-speed network,[3] significant parts of the population – namely low-income, minority, immigrant, non-English speaking, rural, senior and disabled communities – cannot fully participate in this digital revolution due to lack of service by private telecom providers, lack of economic resources to pay for access and equipment, and/or lack of education about the relevance of technology in their lives.[4] Not only are these communities deprived of the economic and social benefits from being connected, the cost of their exclusion increases everyday, thereby exacerbating existing disparities.

In response to the growing chasm that is the digital divide, as one of its strategic initiatives to spark innovative solutions that increase demand for broadband and engender technology adoption by un-served and underserved communities, ZeroDivide invested $275,000 between 2005 and 2006 in 5 non-profit organizations, each of which built a community WiFi network in a low-income community in California and provided computer training and equipment to residents. This report provides a portfolio-level analysis of these

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[1] From "Broadband and Economic Development: A Municipal Case Study from Florida," Applied Economic Studies, April 2005 1, George S. Ford, Thomas M. Koutsk. U.S. Department of Commerce (citing Bureau of Economic Analysis Input-Output Accounts Data, 1999). http://tinyurl.com/cluw5v

[2] 'The Effects of Broadband Deployment on Output and Employment: A Cross-sectional Analysis of U.S. Data." The Brookings Institute. Issues in Economic Policy, Number 6, July 2007. Robert Crandall, William Lehr and Robert Litan. http://tinyurl.com/dmr6q5

[3] "Moving the Needle on Broadband." NCTA White Paper. Washington, D.C. March 2009. http://tinyurl.com/c43w4j

[4] See Public Policy Institute of California's Statewide Survey published in June 2008 in collaboration with The California Emerging Technology Fund entitled "Californians & Information Technology." (http://www.ppic.org/main/publication.asp?i=831)

5 investments. (Please see Appendix 1 for a list of grantee organizations and project descriptions).

Project outcomes indicate that ZeroDivide's community WiFi investments have been effective in ameliorating the digital divide in un-served and underserved communities in that they have helped increase educational and economic opportunity and create social benefits related to civic engagement, public safety, and accessibility to government and social services. Evidence shows that community WiFi programs are indeed a feasible solution for engendering technology adoption when project goals and programs are targeted to meet specific community needs, strong partner relationships exist between community groups and non-profit organizations and municipal entities and private sector companies, and adequate resources are devoted to community outreach and education in addition to computer training and adoption. Furthermore, Community WiFi networks are shown to facilitate community asset building by providing residents the ability to own, operate and coalesce around a communication system facilitates the creation and development of social and economic capital, which leads to individual and community empowerment. In addition, project outcomes reveal that ZeroDivide and their grantees are well positioned to effectively deploy additional community WiFi programs in other un-served and underserved communities, as well as leverage their experience and expertise to advocate for government support to fund such programs and push for regulatory changes on the state and national level that better align economic and social interests of these communities with those of private telecommunications firms and our nation at large. However, ZeroDivide's Community WiFi investments have not yet fully developed into self-sustaining social enterprises with the capacity to provide technical support for equipment and network maintenance or fund advocacy, outreach and technology adoption programs on an ongoing basis.

METHODOLOGY FOR DATA GATHERING & ANALYSIS

The data to produce this report was derived from documents submitted to ZeroDivide by its Community WiFi grantees. These documents include grant proposals, progress reports, budgets, final reports, as well as interviews with respective program officers for each project funded. Because ZeroDivide's main strategic goal was to ameliorate the Digital Divide by sparking social innovation in technology adoption and testing Community WiFi as a proof of concept, and that Community WiFi is still a nascent strategy where best practices for project management is continually being developed, it is important to note that a complete and standardized data set pertaining to project cost and project outcomes was not available for portfolio-level analysis and evaluation. Specific information related to network availability and usage, training participant demographics and motivations, usage frequency and usage purpose were particularly difficult to ascertain due to several factors: 1) Grantees were not required to collect nor report to ZeroDivide a standardized set of data points; 2) Grantees collected data at different levels of granularity; and 3) Each Community WiFi project differed in scope, and ZeroDivide's involvement with each project varied in terms of monetary commitment and project phase funded depending on the role of other investment partners.

The lack of standardization in data collection also made it difficult to calculate direct cost for labor and training when funds allocated to labor for network installation and the delivery of training programs were aggregated into personnel salaries budgeted for the entire grant period. This Community WiFi study reveals a need for ZeroDivide to collaborate with its non-profit partners to create and implement data collection systems for future projects to track and monitor individual and community-level outcomes for ongoing assessment, evaluation and reporting.

WHY COMMUNITY WIFI?

Community WiFi is a technology demand generation and adoption strategy for bridging the Digital Divide. Policy makers, community leaders and technology industry experts began embracing Community WiFi as a way to bring broadband access and engender technology adoption in undeveloped markets in the early 2000s when innovations in wireless technology emerged, making available new networking equipment that enabled un-served and underserved communities to deploy local area networks capable of extending access to all their residents with merely one or two wire line connections. In spite of some technical limitations related to network range, security, and signal reception between physical structures, Community WiFi networks presented a scalable and relatively low-cost and easy-to-deploy solution compared to fiber and wire (i.e., DSL, cable, T1, T3) networks. Community WiFi evangelists and thought-leaders further saw these networks as a means to creating social capital and fostering asset building in low-income communities. Finally, when industry standards for WiFi technology became more developed and technology manufacturers began bringing to market more devices with WiFi capabilities built in to meet demand generated by private sector organizations deploying their own WiFi networks, a proof of concept emerged, thus providing the momentum needed to propel WiFi to the fore.

ZeroDivide set out to test the efficacy of Community WiFi as a technology demand generation and adoption strategy for bridging the Digital Divide with its 5 Community WiFi investments in hopes that it would become a replicable and economically sustainable solution for empowering un-served and underserved communities elsewhere.

COMMUNITY WIFI PORTFOLIO OVERVIEW

Project Name	Grantee	Location	# Of Households Served	Grant Amount
Edenvale/Great Oaks Beehive*	One Economy Corporation	San Jose, CA - Urban	60	$50,000
Little Tokyo Unplugged	Little Tokyo Service Center	Los Angeles, CA - Urban	158	$50,000
Tribal Digital Village -Tribal Homes Demo	Southern CA Tribal Chairman's Association	San Diego, CA - Rural	22	$50,000
Victory/Evergreen Community Connect	Sacramento Region Community Foundation	Sacramento, CA - Urban	76	$100,000
Westside WiFi	Booker T. Washington Community Service Center	San Francisco, CA - Urban	136	$50,000

*Free WiFi access provided at 3 community technology locations only. WiFi network does not extend to resident locations.

General Characteristics

While circumstances surrounding each Community WiFi project ZeroDivide funded were distinct and disparate in terms of scope, geography, stakeholders, and socio-political dynamics, general characteristics can be drawn.

1. **Project Goals and Objectives.** All projects were part of larger digital inclusion efforts aimed at promoting community and economic development in un-served and under-served communities through increased digital literacy, and included multiple programmatic components for delivering broadband access, technology training, in-home computer adoption and community-based content to meet those ends. Although ZeroDivide's involvement with each project varied by scope and timing in terms of number of residents served and project phase funded, the main purpose behind each investment was to seed the implementation of community WiFi systems that had the potential of bridging the digital divide in these communities. Project goals and objectives included:
   (a) Increasing broadband access;
   (b) Providing computer training;
   (c) Offering free or low-cost in-home computer equipment;

(d) Delivering community-specific content via online community portals;

(e) Implementing community WiFi networks and related programming that result in demonstrable economic and social benefits;

(f) Creating feasible, scalable and sustainable community-based WiFi models that can be leveraged for the advocacy of future projects and replication in un-served and under-served communities in other areas.

2. **Location.** All projects, except one, were deployed in urban areas. Two were located in low-income housing complexes, two in low-income neighborhoods. The exception, a project for a Native American tribal community, was located in a rural area outside of San Diego.
3. **Demographics.** All projects targeted low-income communities with predominantly large non-white populations that also included significant but widely varying numbers of seniors (6-40%) and disabled persons (5-30%).
4. **Technology.** Four out of 5 WiFi networks installed off-the shelf networking equipment (Edenvale/Great Oaks Beehive, Little Tokyo Unplugged, Victory/Evergreen Community Connect, Westside WiFi); the Tribal Digital Village network was built using a custom open-source solution created by Champaign-Urbana Community Wireless Network (CUWiN). Three out of 5 WiFi networks extended range of coverage with off-the-shelf mesh networking technology (Little Tokyo Unplugged, Victory/Evergreen Community Connect, Westside WiFi); one used a custom solution (Tribal Digital Village – Tribal Homes Demo).[5]
5. **Community Technology Center.** All project sites included a community technology center where residents received training and access to computer equipment and the Internet if they lacked those at home. These centers also provided space for community meetings, gatherings and after-school programs.
6. **Community Partnering.** All projects were funded, launched and completed in cooperation with community, non-profit, and municipal organizations and private companies that either provided funding or in-kind donations of computers equipment

[5] The Edenvale/Great Oaks Beehive project only installed off-the-shelf networking equipment in 3 technology centers because their project scope did not include extending access to households.

for computer adoption programs. Below is a table showing partner relationships for each project funded.

*Rounded to nearest $100

Project Name	Grantee	Partners
Edenvale/Great Oaks Beehive	One Economy Corporation	• City of San Jose Strong Neighborhood Initiative (SNI) – $11,600 • Edenvale Great Oaks Plan Implementation Coalition (EGOPIC) – Outreach & Training • Knight Foundation – $12,000 • ZeroDivide – $50,000
Little Tokyo Unplugged	Little Tokyo Service Center	• Community Redevelopment Agency of Los Angeles (CRALA) – $3,500 • Countrywide, Inc. – Refurbished Computer Equipment • Los Angeles Dept of Water & Power (LADWP) – $100,000 & use of fiber • SBC Excelerator Foundation – $10,000 • California Consumer Protection Foundation – $50,000 • ZeroDivde – $50,000
Tribal Digital Village -Tribal Homes Demo*	Southern CA Tribal Chairman's Association	• Champaign-Urbana Community Wireless Network (CUWiN) – Software, Installation & Training • Free Press – $10,800 • ZeroDivde – $50,000
Victory/ Evergreen Community Connect	Sacramento Region Community Foundation	• Center for Mutual Cooperation – Youth Engagement & Training • NetEquality – Installation • Sacramento Mutual Housing Association (SMHA) – Project Coordination & Training • Twin Rivers Unified School District – Free online computer learning courses • ZeroDivide – $100,000
Westside WiFi	Booker T. Washington Community Service Center	• San Francisco Dept of Youth & Family Services – $45,000 • San Francisco Housing Authority – Project Coordination • StreetTech – A+ Training & Certification • Strides Center – Refurbished Computer Equipment • ZeroDivide – $50,000

*The Hewlett Packard Foundation funded the creation of the Tribal Digital Village itself, which provides Internet access to community centers, tribal administration buildings and libraries across the reservation.

Project Duration

The grant period for projects funded varied from 12-24 months due to differences in scope, though actual project durations lasted approximately 3-27 months. For example, the Tribal Digital Village Project was a pilot program for testing eventual broadband extension from community centers to tribal offices, educational centers, schools, and 2,400 individual residences. Because this pilot phase only involved 22 homes, the project was completed in a little over 3 months even though the community-wide rollout is still in process to date. Conversely, the Victory Evergreen Community Townhomes Project, which was part of Sacramento's municipal digital inclusion effort and thus inherently more complex, involved the delivery of WiFi access, equipment and training to 76 households located in a municipally owned low-income housing complex. Consequently, it took nearly 27 months to conduct the stakeholdering and coordination required to complete the project. In general, the 5 ZeroDivide funded community WiFi networks were deployed on-time and projects goals and objectives were met successfully.

Project Cost

Zero Divide invested $50,000 in each project except for one – the Community Connect project at Victory Evergreen Community Townhomes in Sacramento, California, which received $100,000.00. These investments, however, only covered a portion of total project cost in that partner organizations also provided funding and donations of labor and computer equipment in-kind. Furthermore, because ZeroDivide funded specific projects within broader digital inclusion programs, project costs reported to ZeroDivide were not reflective of the total cost required to fund these multi-phased programs. Motivated, engaged and committed project staff members also admittedly augmented additional hours required for project success with their own time. Therefore, neither cost-benefit nor cost effectiveness models were applied to the existing data set since overall project expenses were not available for ascertaining meaningful measurements for analysis. However, some data does reveal minimum start-up capital expenditure requirements for deployment:

*Rounded to nearest $100

	Network Hardware/ Software	Network Installation (Labor)	Internet Connection Costs/Year	Computer Equipment/ Peripherals	Tech Training	Total
Edenvale/Great Oaks Beehive	$6,300	Unknown*	$4,300	$5,300	Unknown*	$13,000+
Little Tokyo Unplugged	$14,900	$0**	$0**	$0**	Unknown*	$14,900+
Tribal Digital Village -Tribal Homes Demo	$27,200	$8,800	$6,000	$7,000	$2,000	$45,000+
Victory/ Evergreen Community Connect	$35,400	$0**	$2,000	$0**	$6,000	$43,400+
Westside WiFi	$15,000	Unknown*	$7,000	$0**	$15,000^	$37,000+

*Aggregated into staff salary totals.
**In-kind donation.
^Only represents salaries for Youth Leaders ($10,000) and Youth Instructors ($5,000) who were hired and trained to train residents; does not include personnel salaries for time spent on training youth trainers.

TECHNOLOGY OVERVIEW

Network Architecture (High-Level)

The table below shows the high-level network architecture of each Community WiFi network ZeroDivide seeded, four of which were built using innovative mesh networking technology that enabled community non-profits like ZeroDivide's grantees to bring broadband access to un-served and underserved communities without taking on high, upfront economic risks. These mesh WiFi networks were relatively inexpensive and easy to deploy compared to fiber and wire-line solutions in that one or two fiber or wire connections can be leveraged to extend access to all residents located within a range. Essentially, each 'Community WiFi Network' is connected to an 'Internet Backbone,' originating from either a privately held Internet Service Provider (ISP) or a government municipality ('Broadband Provider'). In the case of the (ISP), the ZeroDivide grantee would pay a monthly fee directly to the ISP for service. In cases where a municipality would dedicate a number of fibers from its own network to the Community WiFi system, such as the one in Little Tokyo, there would be no fee. Bandwidth available for each Community WiFi network varied depending on the type of broadband connection provided.

Community WiFi Network	Internet Backbone	Broadband Provider	Broadband Type	Bandwidth
Edenvale/Great Oaks Beehive	Edenvale/ Great Oaks Community Centers (3)	Unknown	Unknown	Unknown
Little Tokyo Unplugged	Little Tokyo Service Center	LA Dept of Water & Power (Municipality)	Fiber	40 Mbps
Tribal Digital Village -Tribal Homes Demo	Southern CA Tribal Chairman's Association (Main Office)	AT&T (ISP)	T3	45 Mbps
Victory/Evergreen Community Connect	Victory/Evergreen Townhomes (Housing Complex Offices)	Covad (ISP)	DSL (4 lines)	5 Mbps (each line)
Westside WiFi	Booker T. Washington Community Service Center	SpeakEasy (ISP)	DSL (2 lines)	6 Mbps (each line)

Network Architecture (Community-Level)

On a community level, ZeroDivide grantees delivered broadband access to individual resident households located in the area by connecting their respective Internet backbones to a mesh networking system comprised of strategically placed nodes that create multiple gateways to the Internet and antennas that amplify connection signals. Each node is connected to more than one other node in the network via a point-to-point link, and data is transmitted between nodes in the network using the best path at any particular time. While all households contain a device for receiving broadband signals ('router'), only some households also have a strategically placed node. Below is a table detailing the mesh network specifications for the 4 Community WiFi projects that implemented them:[6] (Please see Attachment 2 for a general mesh network topology diagram.)

Project Name	Equipment Vendor	# of Nodes	Avg Download Speed
Little Tokyo Unplugged	Firetide	41	1-2 Mbps
Tribal Digital Village -Tribal Homes Demo	CUWiN**	22	4-5 Mbps
Victory/Evergreen Community Connect	Meraki	35	1-5 Mbps
Westside WiFi	Meraki	11	1.5 Mbps

*Proprietary mesh hardware/software created by Champaign-Urbana Community Wireless Network.

Mesh networks do come with technical limitations, however. For one, they are not yet able to provide good connectivity through physical structures such as concrete walls and across great distances. Second, nodes located inside individual residences must remain operational to ensure the highest level of network availability. And third, the "openness" of the network can present a range of network security issues. Therefore, in order for a mesh network to operate effectively, network equipment must be adequate, well maintained and strategically placed. In addition, network managers must be trained to monitor network availability as well as defend against intrusion.

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[6] Edenvale/Great Oaks Beehive's project scope did not include extension of access beyond the premises of each of their 3 technology centers.

PROJECT OUTCOMES

Access, In-Home Computer Adoption & Training

The table below summarizes measurable outcomes for access, in-home computer adoption and training subsequent to community WiFi deployments. Prior to deployment, very few residents, if any, had in-home computer equipment or broadband access. It is important to note, however, that not all residents have been trained, and many of those who did receive training remain without in-home computer equipment due to insufficient in-kind donations for computer adoption programs and/or funds to purchase enough equipment to meet resident demand. But for these computer adoption programs, which were instrumental in driving resident participation in technology training programs, broadband access alone would not have been great enough of an incentive for engagement. Thus, insofar as broadband access is a baseline requirement, inability to easily access computer equipment and training are barriers to technology adoption.

	Households w/ Broadband Access	Households w/ Equipment	Residents Trained
Edenvale/Great Oaks Beehive	60	35	5*
Little Tokyo Unplugged	158	19	19
Tribal Digital Village -Tribal Homes Demo	22	22	30
Victory/Evergreen - Community Connect	75	60	225
Westside WiFi	136	75	56
Total	451	211	335

*Provided technology, community organizing, outreach and advocacy training to 5 active community members who would in turn train others.

Utilization

The table below summarizes utilization rates for community WiFi networks deployed. Due to the lack of data about resident usage, the types of activities in which residents were engaged while online and the average duration of each session are unknown. However, utilization rates and program director narratives do indicate some technology adoption and demand for broadband.

	Households w/ Equipment	Technology Centers w/ Access	Avg. # of Daily Users	Avg. # of GB Downloaded Daily
Edenvale/Great Oaks Beehive	35	3	Unknown	Unknown
Little Tokyo Unplugged	19	1	176*	756 GB*
Tribal Digital Village -Tribal Homes Demo	22	17	35-40**	10-100 GB**
Victory/Evergreen - Community Connect	60	3	40-60**	4.3 GB**
Westside WiFi	75	1	40-50**	3-4 GB**

*Per network usage report as of Jan 2009.
**Program Officer's estimate as of April/May 2009.

Job Creation/Obtainment

The table below summarizes measurable outcomes related to jobs created and/or obtained subsequent to community WiFi deployments and related training. Due to lack of data about resident usage and frequency of use for job training and/or job searching, the total number of jobs obtained is unknown.

	Jobs Created/Obtained	Types of Jobs Created/Obtained
Edenvale/Great Oaks Beehive	Unknown	Unknown
Little Tokyo Unplugged	1	1 Wireless Network Technician ($37,000/year)
Tribal Digital Village -Tribal Homes Demo	1	1 IT Support Technician - Unpaid
Victory/Evergreen - Community Connect	2	2 Network Technicians ($250/month)
Westside WiFi	26	- 10 Teen IT Support Technicians ($8/hr) -13 Entry Level IT Support Technicians trained/placed (Salary Unknown) - 2 FTEs for SF Digital Inclusion Program (Salary Unknown)
Total	30	

Social Benefits

According to the dataset, the community WiFi deployments and related programming brought numerous social benefits to the impacted communities, individual residents and beyond. While these benefits are less quantifiable, they do speak to the effectiveness of these projects in augmenting educational attainment, promoting economic development, increasing efficiency in delivery of government and social services, fostering community building and empowerment, and spawning civic action.

1. **Educational Attainment.** Community WiFi networks and related programs enhanced the ability of residents to increase their educational attainment by offering opportunities to:
   (a) Access technical training and computer certification (18 Westside Court residents obtained A+ certification);
   (b) Access technology-focused after-school programs held at community technology centers that engage children and youth such as digital storytelling;
   (c) Access online information for school-related research and homework;
   (d) Access distance learning courses offered by colleges and universities, including language training and vocational education.
   (e) Access school websites that help parents stay informed and get involved in their children's education.

2. **Economic Development.** Community WiFi networks and related programs helped promote economic development by:
   (a) Increasing educational and training opportunities for residents to gain the skills required in a technology centric, global economy (e.g., the emergence of "accidental techies");
   (b) Providing employment opportunities in technical support for residents who complete technical training, especially youth;
   (c) Attracting visitors to the area with free WiFi and community portals that highlight local attractions, events and cultural heritage, who then patronized local businesses and, in turn, attracted new enterprises (Little Tokyo and Edenvale/Great Oaks).

(d) Enabling resident consumers to make purchases and conduct financial/banking transactions online.

3. **Delivery of Government & Social Services**. Community WiFi networks and related programs enhanced the delivery of social services by:
   (a) Enabling residents to access online information about government agencies and services;
   (b) Enabling residents to interact with government agencies and communicate with service providers online (residents on TANF at the Tribal Digital Village who seldom interacted with their social workers were able to email them);
   (c) Enabling emergency service providers like police and fire department personnel to communicate and coordinate activities during times of crisis.
   (d) Enabling government agencies to use costs savings derived from increased efficiency to augment other essential programs and services.

4. **Community Asset Building.** Community WiFi networks and related programs engender community asset building by:
   (a) Providing residents an opportunity to own, operate and coalesce around a communication system fosters and enhances individual and community empowerment;
   (b) Facilitating the development of social trust, an essential component to the building of social and political capital;
   (c) Enabling residents to tap into social networks on- and off-line to develop relationships with communities beyond their immediate surroundings;
   (d) Encouraging the use and accumulation of other web-enabled devices that further increase technology adoption and digital fluency.

5. **Community Empowerment.** Community WiFi networks and related programs fostered the development of social capital and community empowerment by:
   (a) Generating awareness and dialogue about the digital divide that spawn civic action and engender cooperation;

(b) Strengthening relationships between residents, businesses, community organizations and government entities, as well as youth, adults and seniors by facilitating increased interaction;

(c) Inspiring residents who received technology training to volunteer to help train others;

(d) Creating shared experiences and feelings about community identity;

(e) Creating civic engagement opportunities that give rise to and cultivate new community leaders;

(f) Facilitating the development of a social network that can be organized and mobilized for civic action.

6. **Civic Action**. Community WiFi programs spawned civic action by residents, businesses and community organizations that affected policy on the community and municipal levels.

(a) More businesses and organizations now want to partner with grantee organizations to expand access and computer adoption programs, which has resulted in increased monetary and in-kind donations of equipment and labor.

(b) Grantee organizations are leveraging project success to push for citywide digital inclusion programs in Los Angeles and Sacramento, CA. The Tribal Digital Village is expanding access to all 2,400 households in the area.

(c) Municipalities are increasingly looking to community WiFi as a tool for economic development and public safety, and funding the development of visitor destination/community portals to benefit residents and local businesses, as well as feasibility studies to examine the potential of utilizing IP-based surveillance camera system to support emergency service departments (Little Tokyo).

(d) Newly engaged residents began organizing around community issues and working for change. Westside Court residents reinvigorated the Tenants Association, which served as an organizing source for securing funding from the City and County of San Francisco for neighborhood redevelopment and extending technology center hours from 14 hours per week to 20 hours per week to accommodate demand. Victory Evergreen residents formed a council to provide input in the creation of a working agreement between the community

and Sacramento Region Community Foundation, which included negotiating pricing and terms of their computer adoption program. Project staff and residents involved with the Little Tokyo project testified before the Public Utilities Commission and were interviewed by press media about their program.

(e) Several staff members involved with the project have become community WiFi evangelists and went on to build networks and/or work on digital inclusion projects in other low-income neighborhoods.

PROJECT ISSUES & CHALLENGES

Much as local libraries can help foster literacy by providing residents free access to reading materials, community WiFi can help increase technology adoption by connecting residents to the Internet at little or no cost. However, evidence shows that having in-home broadband access alone is not enough to engender higher levels of technology adoption or fluency, as it is only one part of the solution. Availability to in-home computer equipment and computer training, as well as community outreach and education about the importance of technology adoption are equally critical to success. In fact, in order for communities and individual residents to embrace technology as an economic and social imperative and find adoption a worthwhile endeavor, considerable effort and resources must be devoted to outreach and education to obtain buy-in from all stakeholders and create a sense of urgency and attainability. Community WiFi deployments must also be managed effectively to avoid protracted timelines that lead to increased costs, and a long-term sustainability strategy must be developed to fund ongoing network maintenance and technology adoption programs. Without addressing these 3 areas, the ability of grantees to reach project goals and objectives and achieve long-term success in bridging the digital divide is hindered.

Community Engagement

The projects garnering high participation rates in training and adoption and ongoing interest in technology adoption were ones that engaged residents and community groups early through surveys, council meetings, and community gatherings prior to deployment. (Victory Evergreen and Little Tokyo). The projects that did not include adequate time and resources devoted to outreach experienced a range of issues stemming from weak partner relationships, lack of staff buy-in, and lack of community interest, such as:

- Difficulty in coordinating with and obtaining permission from residents and municipal housing authority agencies to conduct in-home and on-site equipment installations;
- Insufficient equipment donations from businesses and organizations to meet resident demand for equipment giveaways, which hindered participation in training programs;

- Not enough training programs conducted in languages other than English for ESL residents;
- The creation of programs that did not address community-specific needs and/or were not culturally sensitive. (For example, Victory/Evergreen had a sizable Hmong population where parents were not only extremely reluctant to participate themselves, they discouraged their children from participating, especially if programs and activities took place in the evening. Project staff were able to overcome this by informing Hmong parents about the educational benefits technology can bring.)
- Not enough enthusiasm from project staff to sustain high levels of engagement from project planning through implementation.
- Residents unplugging strategically placed in-home, mesh network equipment because they did not understand their function as being a critical piece of network availability. (Westside)

Project Management

Like lack of partner and community engagement, delays arising from logistic and technical issues can also hinder project success by protracting timelines that result in increased costs for already cash-strapped community organizations. For example, the Tribal Digital Village project suffered a 3-day loss during the deployment phase because software that was not bench tested had to be re-written, which resulted in their having to pay a 3rd party vendor for 8 days instead of the budgeted 5 days for deployment.

In addition, lack of data regarding network usage, training, demographics, adoption, job creation and costs makes measuring ad assessing project success difficult, which might hinder the ability of grantees to substantiate claims around economic and social benefits directly attributable to community WiFi and digital inclusion programs and leverage their success for advocacy and fundraising purposes.

Sustainability

Although ZeroDivide's grantees have been effective in building community WiFi networks and delivering related programming essential to technology adoption, they do not yet have capacity to provide technical support for equipment and network maintenance and ongoing funding for technology adoption programs. While most ZeroDivide community WiFi grantees have been successful in leveraging project success to secure additional funding, most have not been able to develop a business model that can generate enough income to off-set all operational costs. To date, the Tribal Digital Village is the only project likely to become a Wireless Internet Service Provider (WISP) social enterprise. Little Tokyo Service Center has similar aspirations for its community WiFi network but currently lacks the consumer demand in the area required for sustaining one.

Ongoing funding is also needed to provide training to additional residents, but due to bleak economic conditions, with municipalities cutting services and programs citywide to remain solvent, some grantees are struggling to remain operational. In fact, Booker T. Washington Community Service Center might lose some staff as well as funding for teen techies. To create systemic change that would bridge the digital divide in these un-served and underserved communities, grantees must find ways to overcome ongoing funding issues and develop strategies for turning community WiFi networks into social enterprises. Alternatively, community non-profits and residents can push local governments to develop and support public-private partnerships for community WiFi, a strategy that shows promise in creating long-term sustainability while targeting excluded populations.[7]

[7] See "Wireless Pittsburgh: Sustainability of Possible Models for a Wireless Metropolitan-Area Network" by Jon M. Peha. (New America Foundation, 2008). http://tinyurl.com/2qxt4e

KEY LESSONS & RECOMMENDATIONS

Community WiFi is an emerging concept and best practices for deployment and related programming are still being developed. In the meantime, sharing key lessons with grantees will add to the collective knowledge base and help increase probability of success of future deployments.

Community Engagement

- Key Learning: Community outreach must begin prior to network deployment.

  Recommendations:

  - Begin establishing relationships with stakeholders (e.g., residents, community leaders, non-profit partners, government agencies, businesses, etc.) prior to deployment.
  - Add a planning phase to project timelines for needs assessment and outreach.
  - Devote adequate time, funding and personnel to outreach efforts.
- Key Learning: Having strong relationships with the right partners is key to success.

  Recommendations:

  - Partner only with community and municipal organizations that have strong relationships with residents and community leaders and the organizational capacity to deliver programming and services that increase technology adoption.
- Key Learning: Equipment give-away programs are a powerful and important incentive for computer adoption, training and use by residents.

  Recommendations:

  - Make training an eligibility requirement for computer adoption programs.
  - Develop and formalize partnerships with organizations that can provide in-kind equipment donations and/or funding for equipment.
  - Provide printers along with computers. (Students need to print out homework/papers.)
- Key Learning: Programs must be targeted to address community needs.

  Recommendations:

  - Survey residents and other relevant stakeholders prior to deployment.

- Tailor outreach and training programs that address specific needs of each community and are culturally sensitive and language appropriate.
- Transform community technology centers into one-stop-shop community resource centers for social services, job training, after-school programs and community gathering.

➢ Key Learning: Community-specific content development is critical to building markets in un-served and underserved communities.

Recommendations:

- Develop and fund digital storytelling programs.
- Create a portal that attracts online visitors with community specific information and invites community members to contribute content.

Project Management

➢ Key Learning: Avoid logistic and technical issues that cause delays and increase costs by planning ahead.

Recommendations:

- Allocate time for bench testing prior to deployment.
- Plan and coordinate installation schedules with residents and property managers.
- Identify and test equipment placement points for connectivity issues prior to network deployment.

➢ Key Learning: Gather data and document progress and activities for project monitoring and evaluation.

Recommendations:

- Create systems for collecting data and feedback at the individual level (online surveys, sign-in sheets, feedback forms, etc.).
- Collaborate with non-profit partners to create and implement data collection systems for tracking and monitoring community-level program activity for ongoing assessment, evaluation and reporting.
- Develop mechanisms for data and information sharing with partners.

Sustainability

- Key Learning: Secure resources for ongoing network maintenance.

  Recommendations:

  - Train local residents to become maintenance technicians.
  - Form strategic partnerships with private companies, community organizations, community colleges, vocational schools and/or social enterprises that can provide technical expertise on an on-going basis.
  - Develop a long-term strategy to move the community WiFi network to a self-sustaining social enterprise model.

- Key Learning: Secure resources to fund ongoing programs and advocacy efforts.

  Recommendations:

  - Form strategic partnerships with non-profits, philanthropic foundations and government agencies dedicated to eradicating the digital divide.
  - Maintain organization visibility in the community and keep local residents, businesses, non-profit partners and society at-large engaged in conversations around digital divide issues.
  - Generate enough market demand for technology in un-served and underserved communities to sustain a community WiFi-based social enterprise.
  - Convene policy summits like the one hosted by ZeroDivide in 2005 on a regular basis to provide stakeholders, such as technology businesses and professionals, government representatives, and community leaders and activists, opportunities to network, exchange ideas and share best practices.

POLICY IMPLICATIONS

Because of the ubiquitous nature of technology and the Internet, access is increasingly the portal to economic, political, and social power and equality. Yet private telecom firms are currently without a compelling incentive – economic or otherwise – to invest in broadband infrastructure that brings access to un-served and underserved communities. Furthermore, the complexity – and often intractability – of problems associated with the digital divide continue to preclude our government from implementing solutions that reconcile the gap in access on a systemic level. In such a gummed up political environment, rife with competing interests between private industry, government and consumers engaged in a protracted tug-of-war, it seems community non-profits like ZeroDivide are well positioned to deploy community WiFi programs that include training and outreach components essential to technology adoption, especially since market and political pressures don't play out the same way in these communities. These organizations are also well positioned to leverage their knowledge and experience in working with un-served and underserved communities to effectively advocate on their behalf and obtain government funding digital inclusion programs, as well as push for regulatory changes in the telecommunications industry on the state and federal levels that align the economic interests of private companies with our nation's need for developing infrastructure that strengthens long-term economic growth and global competitiveness.

Community WiFi: An Innovative Approach For Bridging The Digital Divide

ZeroDivide's community WiFi investments have been effective in ameliorating the digital divide at the individual and community levels due to 3 factors: 1) WiFi technology and equipment are relatively inexpensive and easy to deploy and scale; 2) community WiFi networks operate within an ecosystem where partnerships between community groups and non-profit organizations, municipal entities and private sector companies already exist; 3) community-specific technology solutions and programming helped facilitate increased adoption, fostered effective community building, and promoted civic action and the creation of social capital.

Like microfinance programs, community-based WiFi programs are relatively low-stake, high-touch initiatives that target local populations and leverage their existing

relationships with and proximity to service providers. According to a 2002 study of community electronic networks and social capital, a community-based approach is even superior to a purely market-based one in that it brings long-term benefits from the creation of social and political capital.[8] Since the root causes of the Digital Divide extend beyond those related to economics, increased community cohesion and political awareness and participation by a more informed citizenry will help mitigate the problem on multiple levels, as broadband access alone cannot bridge a divide stemming from often generations of systemic and chronic disparities in income, employment, educational attainment, health and civic engagement. Therefore, community non-profits with a deeper understanding about these underlying issues have a competitive advantage in engendering technology adoption over private telecom firms whose only concern is generating profit by enlisting subscribers who can pay a particular fee for service. Not only do these community non-profits have more experience in working with communities in need – and usually doing it in a bootstrap fashion, they operate within an ecosystem of cooperation where other community partners can pitch in to help meet community goals and objectives when necessary. Thus, community non-profits have greater flexibility and capacity to implement targeted, community-specific, adaptive (and thus inherently more innovative) solutions that directly address problems causing and perpetuating the Digital Divide that are endemic to each community.

Because of their non-profit status and social mission, community non-profits with expertise and experience in deploying community WiFi networks and providing corollary programs successfully are well-positioned to help expand broadband access to un-served and underserved communities nationwide.

Community WiFi: Enhancing Our National Broadband Infrastructure

A robust, national broadband network would yield innumerable economic and social benefits in that many applications and services such as e-commerce, e-government and e-banking that foster development require high-speed Internet connections to work properly.

[8] "Social Capital and Community Electronic Networks: For-Profit Versus For-Community Approaches," American Behavioral Scientist 2002; 45; 868, John L. Sullivan, Eugene Borgida, Melinda S. Jackson, Eric Riedel, Alina Oxendine and Amy Gangl.

Municipalities that realize the opportunities afforded by community WiFi are already moving to establish and implement comprehensive digital inclusion programs. These cities include most of those where ZeroDivide made its community WiFi investments, as well as Denver, Chicago, Minneapolis, St. Paul, Philadelphia and many others. From enhancing public safety to the delivery of emergency services, alleviating traffic gridlock to social isolation, facilitating parent-teacher interactions to online conversations between cancer patients, enabling distance learning to the secure transfer of electronic records, having broadband infrastructure that is robust and comprehensive is critical to our nation's global competitiveness in the technology centric, 21st century world.

Technology: An Integral Part of the National Policy Agenda

Our nation's long-term economic, political and social health demands that we make investments in technology infrastructure and set appropriate policies on a national level to facilitate that process. In 2004, then President George W. Bush began promoting a free-market, deregulatory-focused approach to universal broadband access by enticing private companies with low taxes, more unlicensed spectrum, less regulation, and a streamlined process for granting broadband providers access to federal land.[9] Recognizing the ability of technology to spawn much needed economic development in the midst of our current global economic crisis, as well as its power to transform societies and help government reach top policy goals related to the Economy, Education, Healthcare and Energy and Environment, President Barack Obama has taken a different approach. First, he made technology a central feature of his domestic policy agenda.[10] Then, he pushed through the American Recovery and Reinvestment Act of 2009, which allocates $7.2 billion to expand broadband access, computer center capacity and sustainable broadband adoption initiatives nationwide. Given this shift in policy – one which makes technology an integral part of our national policy agenda and fundamentally changes the way our society we deals with digital divide issues, it seems ZeroDivide is uniquely positioned to partner with other non-profit organizations already working in those policy areas to create joint solutions where technology adoption is mission-critical. It may even be worthwhile to investigate whether ZeroDivide ought to

[9] See http://georgewbush-whitehouse.archives.gov/infocus/technology/economic_policy200404/chap4.html
[10] See www.whitehouse.gov/issues/technology

develop a customizable turnkey technology adoption program that can be easily plugged into existing and proposed programs at partner organizations that qualify for federal stimulus funding.

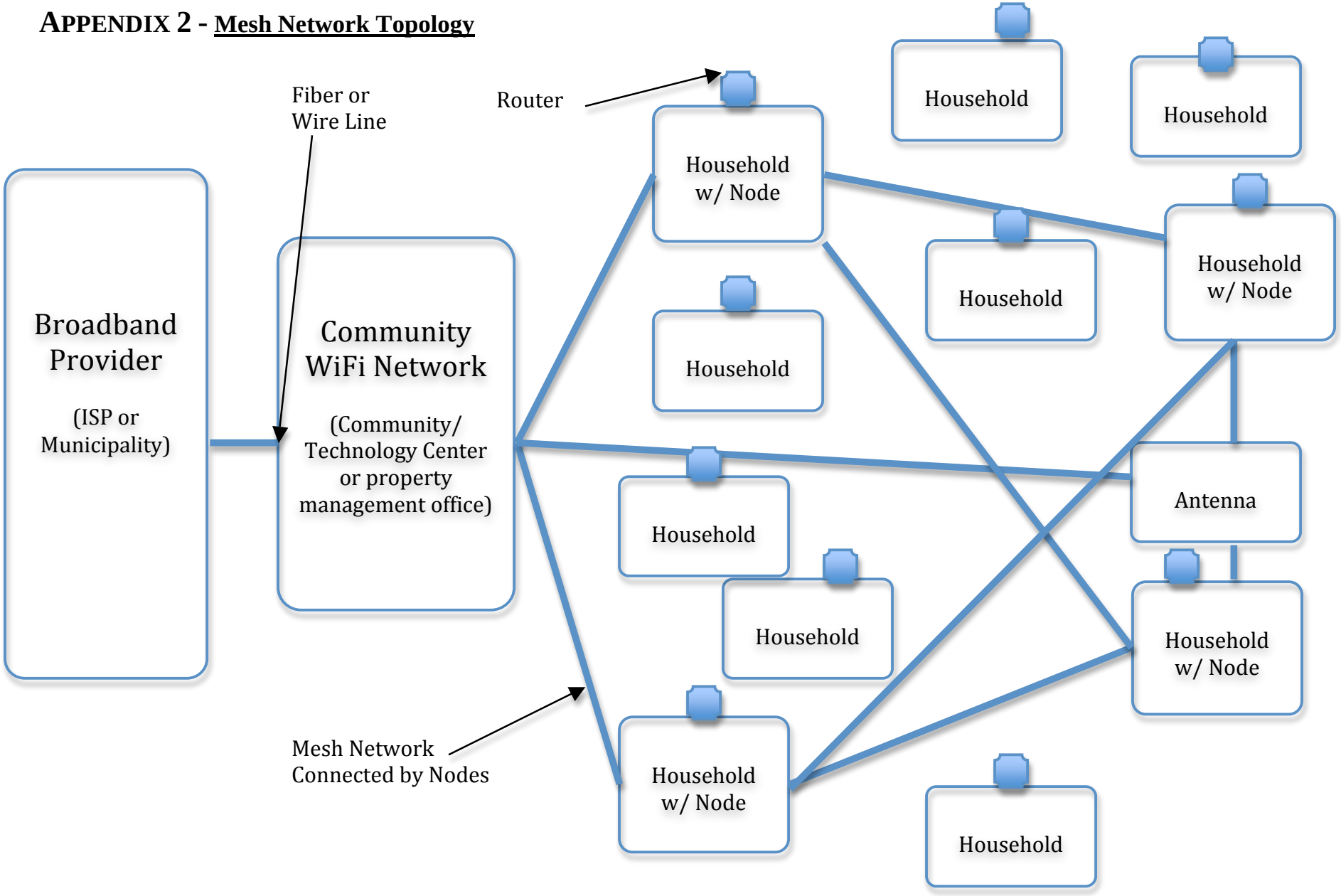
Technology: The Language of The Global Economy

Going forward, it is imperative that any program designed to improve outcomes in education, health, civic engagement, economic development, and social equality include a technology adoption component. For the global economy doesn't just require that some of us know how to do some things with technology; it requires that everyone know how to do everything with technology. Technology is fast becoming an integral part of everyday life and the foundation upon which we are building a new, globalized world, and those lacking in digital literacy will consequently find themselves more and more isolated and excluded. Ultimately, if technology is truly a tool that can democratize access to information and educational opportunities, diminish income and health disparities, bring scientific and social innovation to the global marketplace, and enhance the ability of all human beings to transform themselves into agents of positive social change, surely we must build a bridge for those who have been left behind. And while community-owned electronic networks do not automatically lead to technology adoption, it is an important and necessary first step toward digital literacy – a step that ZeroDivide has been courageous and ingenious enough to make.

APPENDIX 1 - Grantee Organizations and Project Descriptions

Organization	Booker T. Washington Community Service Center	Little Tokyo Service Center	One Economy	Sacramento Region Community Foundation	SoCal Tribal Chairmen's Association
Contact	Program Officer: Jerry Trotter Programs Director (415) 928-6596 jtrotter@btwcsc.org Previous PO: Michael McCarthy (415) 581-3943 (415) 845-3214 michaelmccarthysf@gmail.com	Program Officer: Davis Park Dir of Community Technology Programs (213) 473-1607 dpark@fc.ltsc.org	Program Officer: Alan Greenlee Previous PO: Teresa Gonzales Program Director (408) 928-1108	Program Officer: Priscilla Enriquez (916) 492-6510 Priscilla@sacregcf.org	Program Officer: Matt Rantanen (760) 742-0582 mrantanen@sctdv.net
Project Name	Westside WiFi	Little Tokyo Unplugged	Edenvale/Great Oaks Beehive	Victory/Evergreen Community Connect	Tribal Digital Village: Tribal Homes Build-out Demo
Project Location	Urban - Westside Court Housing Complex and Booker T. Washington Community Center, San Francisco, CA	Urban - Little Tokyo Service Center, Los Angeles, CA	Urban - Edenvale/Great Oaks Neighborhoods San Jose, CA	Urban - Victory Evergreen Community Townhomes	Rural - Indian Reservation, Rural San Diego, Pala, CA
Project Description	Community WiFi project launched as part of SF TechConnect program in partnership with SF Dept of Youth & Family Services	Community WiFi expansion project to extend access to local businesses and residents launched in partnership with Community Redevelopment Agency of Los Angeles (CRALA)	Community WiFi project launched as part of San Jose Strong Neighborhood Initiative (SNI) in partnership with One Economy and Edenvale/Great Oaks Plan Implementation Coalition (EGOPIC)	Community WiFi project launched as part of larger Digital Inclusion municipal WiFi project	Community WiFi project as part of TDV launched in partnership with Champaign-Urbana Wireless Network (CUWiN) to connect geographically dispersed residents

APPENDIX 2 - Mesh Network Topology



PPIC STATEWIDE SURVEY

CALIFORNIA

JUNE 2008

Californians & information technology

in collaboration with
The California Emerging Technology Fund

Mark Baldassare
Dean Bonner
Jennifer Paluch
Sonja Petek

PPIC PUBLIC POLICY INSTITUTE OF CALIFORNIA

The Public Policy Institute of California is dedicated to informing and improving public policy in California through independent, objective, nonpartisan research on major economic, social, and political issues. The institute's goal is to raise public awareness and to give elected representatives and other decisionmakers a more informed basis for developing policies and programs.

The institute's research focuses on the underlying forces shaping California's future, cutting across a wide range of public policy concerns, including economic development, education, environment and resources, governance, population, public finance, and social and health policy.

PPIC is a private, nonprofit organization. It does not take or support positions on any ballot measures or on any local, state, or federal legislation, nor does it endorse, support, or oppose any political parties or candidates for public office. PPIC was established in 1994 with an endowment from William R. Hewlett.

Mark Baldassare is President and Chief Executive Officer of PPIC. Thomas C. Sutton is Chair of the Board of Directors.

PUBLIC POLICY INSTITUTE OF CALIFORNIA
500 Washington Street, Suite 600
San Francisco, California 94111
phone: 415.291.4400
fax: 415.291.4401

PPIC SACRAMENTO CENTER
Senator Office Building
1121 L Street, Suite 801
Sacramento, California 95814
phone: 916.440.1120
fax: 916.440.1121

www.ppic.org
survey@ppic.org

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ABOUT THE SURVEY

The PPIC Statewide Survey series provides policymakers, the media, and the general public with objective, advocacy-free information on the perceptions, opinions, and public policy preferences of California residents. Inaugurated in April 1998, this is the 87th PPIC Statewide Survey in a series that has generated a database that includes the responses of more than 185,000 Californians. This survey is the first in a new five-year PPIC Statewide Survey series focusing on information technology issues, funded with grants from the California Emerging Technology Fund and from ZeroDivide. The series' intent is to inform state policymakers, encourage discussion, and raise public awareness about a variety of information technology issues. For this benchmark survey, we draw upon earlier PPIC Statewide Surveys for California trends over time and recent surveys by the Pew Internet & American Life Project for national comparisons.

Although the use of the Internet and information technology is expanding nationally, with California a global leader in this arena, we know from past studies that a number of large and important subgroups in the California population do not have access to information technology. Given the role of the Internet in modern society, and the reality of the digital divide, this survey seeks to inform and improve public policy choices involving this disjunction between large populations who are and are not "connected." We examine both access and use of information technology as well as the public's perceptions and attitudes.

This survey presents the responses of 2,503 adult residents interviewed in multiple languages and reached by landline and cellular telephone throughout the state, on the following topics:

- Access and use of information technology, including computer ownership, home Internet and broadband connections, and overall use of computers, the Internet, and email. We also ask about a variety of specific activities that are conducted on the Internet, how often residents access the Internet or email, what kind of Internet connection they have at home, and other issues related to home broadband adoption. We ask about the manner in which the Internet is used outside home and work, the use of mobile devices for the Internet and other purposes, and parents' use of the Internet to connect to their children's schools.
- Perceptions and attitudes regarding information technology, including the importance of access to the Internet, the importance of the Internet as a source of information in daily life, the role of government in Internet regulation and in improving the access and availability of broadband Internet technology, and residents' comfort with and confidence in technology. We also ask about whether Californians in lower-income and rural areas are less likely to have access to broadband Internet technology and the level of concern regarding these access issues.
- California trends over time and differences between Americans nationally and Californians in access, uses, perceptions, and attitudes about information technology.
- Variations in behaviors, perceptions, and attitudes regarding information technology issues across the five major regions of the state (Central Valley, San Francisco Bay Area, Los Angeles County, Inland Empire, and Orange/San Diego Counties), among Asians, blacks, Latinos, and non-Hispanic whites, between urban and rural communities, and among socioeconomic and political groups.

Copies of this report may be ordered online (www.ppic.org) or by phone (415-291-4400). For questions about the survey, please contact survey@ppic.org. View our searchable PPIC Statewide Survey database online at http://www.ppic.org/main/survAdvancedSearch.asp.

PRESS RELEASE

Para ver este comunicado de prensa en español, por favor visite nuestra página de internet: http://www.ppic.org/main/pressreleaseindex.asp

PPIC STATEWIDE SURVEY: CALIFORNIANS AND INFORMATION TECHNOLOGY

More Shop, Get News Online – Yet Digital Divide Widens

AS CALIFORNIANS BROADEN USE OF WEB, LATINO AND LOW-INCOME RESIDENTS LEFT BEHIND

SAN FRANCISCO, California, June 25, 2008 — At least half of Californians go online to get news, make purchases, look for health information, or visit government websites. But as the state's residents integrate the Internet into their daily lives, there are signs that the digital divide is widening for some groups, particularly Latino and low-income residents. These are among the key findings in a statewide survey released today by the Public Policy Institute ofCalifornia (PPIC) in collaboration with the California Emerging Technology Fund.

Californians value access to the web: Nearly all Internet users (92%) say it is at least somewhat important in everyday life, and even 56 percent of those who don't go online agree. But disparities in Californians' use of technology reveal a digital divide: Residents who are white, black, or over age 55 have significantly increased their use of computers and the Internet since 2000, while Latinos, Asians, and low-income residents have not.

"Many Californians go online to research the decisions they make as voters, taxpayers, and consumers," says Mark Baldassare, PPIC president and CEO. "Yet there are tremendous differences in access to critical information that put many at a disadvantagein their everyday lives. At a time when technology's role is growing and in a state that has led the way, this poses a major policy challenge."

COMPUTER USE SIMILAR IN CALIFORNIA AND NATION

Three in four Californians (75%) use a computer at home, school, or work, a statistic that has held steady since 2000. A 2008 survey by the Pew Internet & American Life Project found similar results (74%) nationwide. The percentage of Californians who use the Internet has increased since 2000, from 65 percent to 70 percent. Today, Californians and adults across the nation are equally likely to have Internet access at home (63% vs. 62% in the 2008 Pew survey) and a broadband connection (55% each).

WHITE, BLACK, OLDER CALIFORNIANS INCREASE USE

Differences emerge in the way demographic groups use technology.

- **Race/ethnicity:** Since 2000, computer use has grown among whites (79% to 85%) and blacks (76% to 83%), as has Internet use (70% to 81% for whites, 60% to 82% for blacks). Among Latinos, computer use has declined (64% to 58%) and Internet use is unchanged (47% to 48%). Asians have seen declines in both their use of computers (91% to 81%) and the Internet (84% to 80%).
- **Age and income:** Internet use has grown sharply among those age 55 and older (42% to 58%), but not among adults with household incomes less than $40,000 (47% to 49%). Adults under age 35 are more likely to use the Internet (78%) than older adults. Almost all adults with household incomes of $80,000 or more use computers (94%) and the Internet (92%).

FEWER LATINOS HAVE COMPUTERS, WEB ACCESS AT HOME

A digital divide is also apparent among ethnic/racial groups, income levels, and regions when comparing rates of computer ownership, Internet access, and broadband connections at home.

- **Race/ethnicity:** Less than half of Latinos (48%) have home computers compared to about eight in 10 or more for whites (86%), Asians (84%), and blacks (79%). Just four in 10 Latinos (40%) have Internet access and a third (34%) broadband connection at home. In contrast, majorities in other racial or ethnic groups have both Internet access and broadband.
- **Income:** Among households with incomes under $40,000, half have home computers, but only four in 10 (40%) have home Internet access and just a third (33%) have broadband. At higher income levels, overwhelming majorities of Californians have home computers, Internet access, and broadband.
- **Region:** Majorities in each region of the state say they have home computers and Internet access, but Los Angeles residents report lower rates of broadband connection (48%) than residents in the San Francisco Bay Area (65%), Orange County/San Diego (58%), Inland Empire (56%), and Central Valley (53%). Rural residents are somewhat less likely than urban residents to have a computer (65% vs. 73%), Internetconnection (58% vs. 63%), or broadband (51% vs. 56%).

WHAT ARE CALIFORNIANS DOING ONLINE?

Californians are far more likely than they were in 1999 (PPIC Statewide Survey: Californians and Their Government, September 1999) to report that they go online to shop (52% vs. 30% in 1999) or get news about current events (55% vs. 43% in 1999), and slightly more likely to seek information about their work or jobs (49% vs. 45% in 1999). Half of Californians (50%) look for health information online or visit government websites. Less than half (47%) bank or manage finances online or look for community events and activities (47%). Fewer go online to use government resources, such as downloading forms (43%); get housing or real estate information (40%); engage in education activities, such as taking a class (27%); or use social networking sites (26%), such as Facebook, MySpace, or LinkedIn.

Stark differences emerge in the way demographic groupsuse the Internet. Latinos are more likely than they were in 1999 to go online for news (35% vs. 28%), but far less likely to do so than whites (67%), blacks (62%), and Asians (61%). Comparing age groups, most people under age 35 (62%) and between ages 35 and 54 (61%) get news online, compared to 41 percent of residents age 55 and older.

While more Latinos report shopping on the web today (29% vs. 16% in 1999), they are far less likely than whites (67%), blacks (63%), or Asians (58%) to research or make purchases online. Among other differences:

- **Health information:** While half of Californians say they get health information online, lower income adults (30%) and Latinos (31%) are the least likely to do so.
- **Social networking:** Half of residents under age 35 use social networking sites, compared to 20 percent in the 35-54 age group and 8 percent of adults over age 55.
- **School websites:** More than half of parents (56%) visit their children's school websites. However, only 30 percent of those with household incomes under $40,000 do so, compared to 84 percent of those with incomes of $80,000 or more.

WHO'S TEXTING?

Some experts have suggested that mobile devices may be the platform to bridge the digital divide because a phone and service plan costs less than a computer and Internet connection. In California, 75 percent of all adults and solid majorities in all demographic categories have cell phones. Whites (83%) and blacks (78%) are more likely than Asians (72%) and Latinos (63%) to have cell phones.

Nearly six in 10 use their cell phones to send or receive text messages, and younger residents (87%) are the most likely to do so. They are also the most likely to use their cell phones for email or to access the Internet. Overall, one in four Californians uses cell phones for email (26%) or to go online (25%).

MORE KEY FINDINGS:

More have DSL connections– Page 12

To access the Internet, 29 percent have DSL, 19 percent have cable modems, 5 percent have wireless, and 2 percent have fiber optic or T-1 connections. Just 7 percent have dial-up connections.

Most say cities should provide free wireless– Page 19

As local governments consider the benefits and difficulties of providing free wireless Internet access, 67 percent of Californians say it is a good idea and 26 percent say it is a bad one.

Comfort with technology, worries about security– Pages 20, 21

Internet users are comfortable using technologybut less confident that they can keep viruses and spyware out of their computers. They're even less confident about the security and privacy of financial transactions online.

Californians concerned about digital divide– Page 22

Two-thirds (65%) think Californians in lower-income areas are less likely to have broadband Internet access, and nearly as many (62%) are at least somewhat concerned about the disparities.

ABOUT THE SURVEY

This is the first survey in a series on public opinion and information technology conducted with funding from the California Emerging Technology Fund and ZeroDivide. The report is based on a telephone survey of 2,503 California adult residents, including 2,253 interviewed on landline telephones and 250 on cell phones, conducted between June 3 and June 17, 2008. Interviews were conducted in English, Spanish, Chinese (Mandarin or Cantonese), Vietnamese, and Korean. The sampling error for the 2,503 adults is +/- 2%. The sampling error for subgroups is larger. For more information on methodology, see page 25.

Mark Baldassare is president and CEO of PPIC, where he holds the Arjay and Frances Fearing Miller Chair in Public Policy. He is founder of the PPIC Statewide Survey which he has directed since 1998. This is the 87th PPIC Statewide Survey in a series that hasgenerated a database that includes the responses of more than 185,000 Californians.

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This report and a related*Just the Facts: The Digital Divide*will appear on PPIC's website (www.ppic.org) after 10 p.m. on June 25, 2008.

ACCESS AND USE

KEY FINDINGS

- Although the percentage of Californians using computers has not grown since 2000, the share who say they use the Internet has increased five points. Californians' usage is also similar to that of adults nationwide. Racial/ethnic, regional, and demographic disparities in ownership and computer use point to a digital divide in California. *(pages 8, 9)*

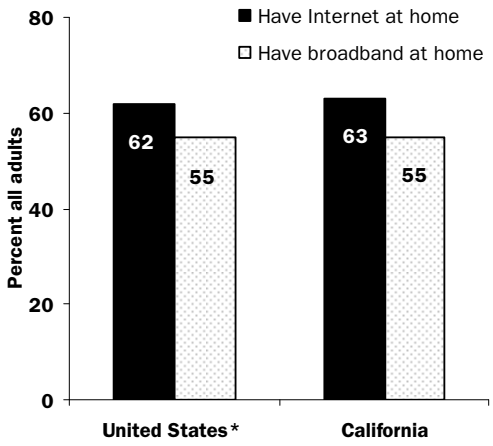
- At least half of Californians are using the Internet to get news, buy goods and services, get medical information, and visit government websites. There are large differences in specific uses of the Internet across racial/ethnic, income, and regional groups. Young adults are more likely to do social networking online. *(pages 10, 11)*

- DSL-enabled phone lines are the most common type of broadband Internet connection in the homes of California Internet users. Most say they like broadband because of the faster access and greater speed. *(pages 12, 13)*

- Many cell phone users, especially those under 34, are sending and receiving text messages on their phones, while just one in four use them to access the Internet or send emails. Internet use outside of home and work is most common among upper-income and younger Californians. *(pages 14, 15)*

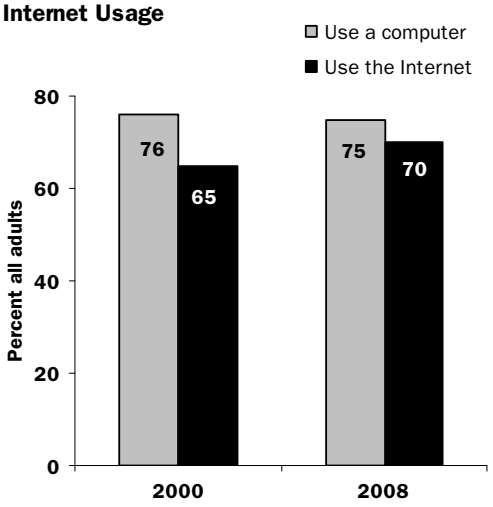
- Half of California parents with school-age children visit their children's school websites and three in 10 get homework assignments through the Internet or by email. Income and racial/ethnic disparities point to a digital divide among parents of school-age children. *(page 16)*

Internet Access and Broadband at Home

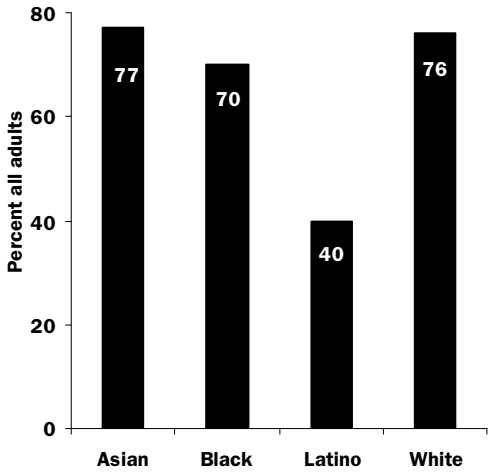


**Pew Internet & American Life Project*

Californians' Overall Computer and Internet Usage



Californians with Internet in the Home



COMPUTER AND INTERNET ACCESS AT HOME

Large majorities of Californians today report that they have a computer (72%) and Internet access at home (63%). Californians are just as likely as residents nationwide to have Internet access at home (63% to 62%), according to a 2008 Pew Internet & American Life Project survey, and are just as likely to have broadband at home (55% each). (Broadband users are defined as having a DSL, cable, wireless, T-1, or fiber-optic Internet connection.) More Californians have computers at home today than in 1999 (63%); a similar comparison for Internet access at home is not available.

A digital divide is apparent today when comparing rates of home computer ownership, Internet connection, and broadband access across demographic groups. Fewer than half of Latinos (48%) report having a computer at home, compared to about eight in 10 or more whites (86%), Asians (84%), and blacks (79%). The same trends hold for having an Internet connection and broadband service. Lower-income respondents are also less likely to have a computer (50%), Internet access (40%), or home broadband service (33%), while almost all adults earning over $80,000 a year have a computer (97%), Internet access at home (90%), and a broadband connection (85%). Adults over 55 are less likely to report having a computer (67%), an Internet connection at home (53%), or home broadband service (44%) than adults under 35 (71%, 68%, and 60%, respectively).

A regional disparity is also apparent: Los Angeles residents (48%) report having a broadband connection at a lower rate than do San Francisco Bay Area residents (65%). Residents in rural areas are also somewhat less likely to have a computer, Internet access, or broadband connection at home.

What is the main reason that adults do not have a computer at home? Thirty-seven percent say the cost of a computer, while fewer say they do not want one (22%) or they do not know how to use one (21%).

"Do you have…"

Percent saying yes		**… any type of personal computer, including laptops, in your home?**	**…. an Internet connection at home?**	**…a broadband connection at home?**
All Adults		72%	63%	55%
Age	**18-34**	71	68	60
	35-54	77	67	61
	55 and over	67	53	44
Income	**Under $40,000**	50	40	33
	$40,000 to $79,999	84	76	64
	$80,000 or more	97	90	85
Race/Ethnicity	**Asian**	84	77	67
	Black	79	70	66
	Latino	48	40	34
	White	86	76	68
Region	**Central Valley**	68	62	53
	San Francisco Bay Area	79	71	65
	Los Angeles	67	55	48
	Orange/San Diego	75	66	58
	Inland Empire	73	63	56
Community	**Rural**	65	58	51
	Urban	73	63	56

OVERALL COMPUTER AND INTERNET USAGE

Three in four Californians report using a computer at home, school, or work (75%) and seven in 10 access the Internet (70%). Overall computer use today is similar to 2000 (76% 2000, 75% today), but Internet use has increased somewhat (65% to 70%). According to the 2008 Pew Internet & American Life Project survey, Californians and adults nationwide today are similar in computer use (75% to 74%) and Internet use (70% to 73%).

Mirroring the divide in computer ownership and Internet access at home, a gap in overall computer and Internet use is evident across demographic groups. Whites (85%), blacks (83%), and Asians (81%) are again far more likely than Latinos (58%) to use a computer. In addition, about six in 10 Californians (58%) who earn less than $40,000 annually report that they use a computer, while almost all adults who earn more than $80,000 (94%) use a computer. Adults younger than 35 are the age group most likely to report using a computer (83%) or the Internet (78%), while adults 55 and over are the least likely (62%, and 58%, respectively).

Across the state's regions, Los Angeles residents have the lowest rate of computer and Internet usage (70% and 61%, respectively), while the San FranciscoBay Area has the highest (81% and 77%). The rate of computer use is higher in urban areas (76%) than in rural communities (66%) and the Internet is also used at higher rate within urban communities (70% to 63%)

Percent saying yes		Computer Use	Internet Use
		Do you ever use a computer at home, at work, or at school?	**Do you ever go online to access the Internet or worldwide web or send or receive email? *or* Do you send or receive email, at least occasionally?**
All Adults		75%	70%
Age	**18-34**	83	78
	35-54	78	73
	55 and over	62	58
Income	**Under $40,000**	58	49
	$40,000 to $79,999	86	83
	$80,000 or more	94	92
Race/Ethnicity	**Asian**	81	80
	Black	83	82
	Latino	58	48
	White	85	81
Region	**Central Valley**	74	71
	San Francisco Bay Area	81	77
	Los Angeles	70	61
	Orange/San Diego	77	73
	Inland Empire	73	70
Community	**Rural**	66	63
	Urban	76	70

SPECIFIC INTERNET ACTIVITIES

At least half of Californians use the Internet for getting news and information on current events (55%), to buy goods and services (52%), to get health and medical information (50%), and to visit a state, local, or federal government website (50%). Just under half use the Internet for information for their work or job (49%), to bank or manage finances online (47%), to get information about activities or events in their community (47%), or to get news and information about politics or the 2008 campaigns (46%). Fewer residents report going online to access government resources such as downloadable forms (43%), to get housing and real estate information (40%), for educational activities such as taking a class (27%), or to use a social networking site (26%).

Compared to 1999, Californians are far more likely now to report going online for shopping (30% 1999, 52% today) and to get news about current events (43% 1999, 55% today); residents are slightly more likely now to go online for information for their work or job (45% 1999, 49% today).

In recent surveys conducted by the Pew Research Center, Internet users nationwide are less likely than California's Internet users to report going online for certain activities. Seventy-nine percent of California Internet users have gone online to get news and information about current events, compared to 71 percent nationwide. The pattern is similar for going online to get news or information about politics or the 2008 campaigns (65% of California Internet users to 55% U.S. Internet users), online shopping (75% to 66%), visiting government websites (71% to 66%), going online for information about their work or job (70% to 47%), to bank or manage finances (67% to53%), and for educational purposes such as taking a class (39% to 12%).

"Please tell me if you ever use the Internet to do any of the following things: How about going online …"

Percent saying yes		…to get news on current events?	…to purchase goods and services?	…to get health or medical information?	…to visit a government website?	…for information for your work or job?	…to do any banking?
All Adults		55%	52%	50%	50%	49%	47%
Age	**18-34**	62	56	54	54	60	54
	35-54	61	57	54	54	55	51
	55 and over	41	43	43	41	29	35
Income	**Under $40,000**	34	27	30	27	30	26
	$40,000 to $79,999	68	63	60	65	58	58
	$80,000 or more	79	84	74	75	74	74
Race/Ethnicity	**Asian**	61	58	55	56	58	57
	Black	62	63	52	60	47	55
	Latino	35	29	31	27	34	28
	White	67	67	62	64	58	58
Region	**Central Valley**	50	50	51	50	49	43
	San Francisco Bay Area	66	62	57	60	57	55
	Los Angeles	49	44	45	42	43	41
	Orange/ San Diego	60	60	51	54	53	55
	Inland Empire	50	47	49	46	43	44
Community	**Rural**	48	47	46	46	45	42
	Urban	55	53	51	50	49	47

SPECIFIC INTERNET ACTIVITIES *(CONTINUED)*

Despite California's overall higher rate of Internet activity, reports of Internet activity are significantly different across racial/ethnic and demographic subgroups, pointing again to a digital divide within the state. Lower-income Californians, Latinos, and olderresidents are overwhelmingly less likely than others to rely on the Internet for typical uses, with fewer than half reporting that they do so. Lower-income residents (30%) and Latinos (31%) are also far less likely than others to say they use the Internet to get health or medical information. Also, when it comes to online shopping, residents with annual household incomes over $80,000 (84%) and incomes between $40,000 and $80,000 (63%) are significantly more likely than those with incomes under $40,000 (27%) to say they have done this. And while just 29 percent of Latinos report shopping online, solid majorities of Asians (58%), blacks (63%), and whites (67%) say they do As income and education levels rise, residents are much more likely to say they bank online, get news online, and get information for their jobs online.

As for regional differences, San Francisco Bay Area residents are much more likely than Los Angeles residents to have been engaged in a variety of online activities, including getting news on current events, shopping, getting medical information, visiting a government website, and doing banking. Rural residents lag somewhat behind urban residents in most Internet activities.

Half of residents under 35 are using a social networking site while 20 percent of 35–54 year olds and just 8 percent of those 55 and older do so.

"Please tell me if you ever use the Internet to do any of the following things: How about going online …"

Percent saying yes		…to get information about your community?	…to get news or information about politics?	…to access government resources?	…to get housing or real estate information?	…for your education?	…to use a social networking site?
All Adults		47%	46%	43%	40%	27%	26%
Age	**18-34**	52	52	45	44	43	52
	35-54	52	50	47	47	26	20
	55 and over	36	33	35	28	11	8
Income	**Under $40,000**	30	27	23	24	20	26
	$40,000 to $79,999	56	57	54	47	31	27
	$80,000 or more	71	65	66	60	37	29
Race/Ethnicity	**Asian**	54	47	52	47	35	37
	Black	59	54	49	52	36	37
	Latino	29	29	22	22	21	22
	White	57	55	54	50	27	25
Region	**Central Valley**	43	38	41	38	29	26
	San Francisco Bay Area	59	56	52	47	26	30
	Los Angeles	40	42	35	34	25	25
	Orange/ San Diego	53	50	52	42	28	27
	Inland Empire	42	39	39	37	28	29
Community	**Rural**	41	40	38	39	20	18
	Urban	48	46	43	40	27	27

FREQUENCY OF INTERNET USAGE

Four in 10 California Internet users go online or check email several times a day when at home; 43 percent go online several times a day from work. Sixty-six percent of California Internet users go online less frequently—once a day or more—from home. Fifty-two percent go online once a day or more from work. Very few Internet users go online or check email frequently outside home or work.

California Internet users today are more likely than those nationally to use the Internet or email from home at least once a day (66% to 58%). They are only slightly more likely than national users to use the Internet or email from work at least once a day (52% to 44%), according to the 2008 Pew survey.

"About how often do you use the Internet or email from…"

Internet users only	**…home?**	**…work?**	**… some place other than home or work?**
Several times a day	41%	43%	8%
About once a day	25	9	6
3-5 days a week	13	5	6
1-2 days a week	9	4	8
Every few weeks	3	1	7
Less often	3	5	24
Never *(volunteered)*	6	33	41

INTERNET CONNECTION AT HOME

Sixty-three percent of California residents report having some type of Internet connection at home. Fifty-five percent have a broadband connection—including 29 percent with a DSL connection, 19 percent with a cable modem, 5 percent with wireless, and 2 percent with a fiber optic or a T-1 connection. Only 7 percent report having a dial-up connection. Californians are just as likely as Americans nationwide to have broadband at home (55% each), according to the 2008 Pew survey.

The adoption of broadband in the home varies greatly by income and education level, varies slightly by urban and rural location, and is twice as high among whites as Latinos (68% to 34%). Adults 55 years and older (44%) are less likely than others to have broadband. Broadband use is highest in the San Francisco Bay Area (65%) and lowest in the Central Valley (53%) and Los Angeles County (48%).

"What kind of Internet connection do you have at home? Do you use a dial-up telephone line, or do you have some other type of connection, such as a DSL-enabled phone line, a cable TV modem, a wireless connection, a fiber optic connection such as FiOS or a T-1?"

	All Adults	**Household Income**			**Community**	
		Under $40,000	**$40,000 to $79,999**	**$80,000 or more**	**Rural**	**Urban**
Dial-up telephone line	7%	7%	11%	5%	6%	7%
DSL-enabled phone line	29	18	35	43	27	29
Cable modem	19	11	23	29	15	20
Wireless connection	5	3	4	9	6	5
Fiber optic or T-1	2	-	2	4	3	2
Other (*volunteered*)	1	1	-	1	1	1
No Internet/computer at home	36	60	23	9	42	35
Don't know	1	-	2	-	-	1

BROADBAND ADOPTION

When asked what they like most about having a high-speed Internet connection, seven in 10 broadband users mention faster access or greater speed. Far fewer broadband users cite other reasons. More than six in 10 across racial/ethnic, income, age, and regional groups hold this view.

"What do you like most about having a high-speed Internet connection at home?"

Broadband users only	All Broadband Users	Race/Ethnicity		Income		
		Latino	White	Under $40,000	$40,000 to $79,999	$80,000 and above
Faster access/greater speed	71%	74%	72%	70%	68%	74%
Convenience in general	11	11	11	11	12	11
Easier to check email/ easier to communicate	3	2	2	4	3	2
Doing job-related tasks from home/working from home	2	2	2	1	2	3
Downloading all types of files faster	2	1	2	2	2	1
The 'always on' connection	2	2	2	2	3	3
Other (*volunteered*)	7	5	7	8	7	4
Don't know	2	3	2	2	3	2

Of those who have broadband, nearly six in 10 say they subscribe to basic service, while about three in 10 subscribe to a premium service that promises faster speed. Subscribing to premium service increases with income and age. Whites (32%) are somewhat more likely than Latinos (25%) to subscribe to premium service. Fewer than four in 10 broadband users in individual regions subscribe to premium service, with residents in the Inland Empire (37%) the most likely to do so.

"Thinking about your high-speed Internet service at home, do you subscribe to a basic broadband service, or do you pay extra for a premium service that promises faster speed?"

Broadband users only	All Broadband Users	Race/Ethnicity		Income		
		Latino	White	Under $40,000	$40,000 to $79,999	$80,000 and above
Subscribe to basic service	58%	64%	56%	66%	59%	55%
Subscribe to premium service at higher price	31	25	32	24	32	33
Don't know	11	11	12	10	9	12

Among Internet users who do not have a broadband connection in their home, 74 percent say that high-speed Internet service is available in their neighborhood. Asked if they would like to have a faster broadband connection, seven in 10 dial-up users say they are not interested. When asked what it would take for them to switch to broadband, 35 percent of these dial-up users say that the price of broadband would have to be lower, but one in four say they are simply not interested in switching to broadband.

MOBILE DEVICES

Seventy-five percent of California adults say they have a cell phone. While cell phone ownership increases with education and income, about six in 10 or more in all demographic groups have a working cell phone. Across racial/ethnic groups, whites (83%) and blacks (78%) are more likely than Asians (72%) and Latinos (63%) to have a cell phone. A majority of cell phone users (58%) say they use the device to send or receive text messages, while about one in four send or receive email (26%), or access the Internet (25%) with their mobile phone.

Use of a cell phone to send or receive text messages is highest by far among younger cell phone users (87% under 35, 57% 35–54, 23% age 55 and over). Across racial/ethnic groups, Latinos (63%) are more likely than whites (54%) to text-message (sample sizes for black and Asian cell phone users are too small for separate analysis). Majorities of cell phone users across income groups and regions report using their cell phones to send and receive text messages. Residents who have broadband Internet at home are more likely than those without to send or receive text messages on a cell phone.

When it comes to using their cell phones to send and receive email messages, younger cell phone users (39%) are more likely to do this than others. Upper-income cell phone users (30%) are slightly more likely than others (24% under $40,000, 24% $40,000-$80,000), and Latinos slightly more likely than whites (29% to 23%), to use a cell phone for this purpose. Across regions, cell phone users in the San Francisco Bay Area are somewhat less likely to report this activity than those in other regions.

Using cell phones to access the Internet is another activity that has been adopted much more often by younger users (41% under 35, 23% 35–54, 9% 55 and over). Across racial/ethnic groups, Latinos (25%) and whites (22%) are similarly likely to use a cell phone for Internet access. Among cell phone users in California who use them to access the Internet, 15 percent do not have a home Internet connection, while 84 percent do.

"Do you ever use your cell phone to…"

Cell phone users only *Percent saying yes*		***…send or receive text messages?***	***…send or receive email?***	***…to access the Internet?***
All Cell Phone Users		58%	26%	25%
Age	**18-34**	87	39	41
	35-54	57	26	23
	55 and over	23	11	9
Income	**Under $40,000**	60	24	26
	$40,000 to $79,999	56	24	20
	$80,000 or more	62	30	30
Race/Ethnicity	**Latino**	63	29	25
	White	54	23	22
Region	**Central Valley**	58	27	26
	San Francisco Bay Area	57	23	22
	Los Angeles	60	28	30
	Orange/San Diego Inland Empire	59	29	26

INTERNET USE OUTSIDE OF HOME AND WORK

More than one in three California Internet users (35%) access the Internet from someplace other than work or home at least once every few weeks. Of these, 60 percent use a laptop computer with a wireless connection, 42 percent use a cell phone or handheld device, and 37 percent use a computer at a public library.

More affluent (52%) and younger Californians (62%) are also the most likely use a laptop through a wireless connection when going online outside work or home. Those in the San Francisco Bay Area and Los Angeles (65% each) are more likely to access the Internet using a laptop through a wireless connection. Of those who use a wireless laptop, 72 percent have used public WiFi or other public wireless Internet services. Of those using WiFi, 55 percent have mostly used free services, 9 percent have mostly used pay services, and 34 percent have used a mix of the two.

Using cell phones or handheld devices to access the Internet is most popular among younger (49%) and more affluent Californians (58%). Whites and Latino do so equally (41% each).

Less affluent Californians (51%) are more likely to use a computer at a public library to access the Internet. Latinos (40%) are far more likely than whites (28%) to do so.

Among all adults, accessing the Internet with a wireless laptop, a cell phone, or at the library is rare and infrequent (14%, 10%, and 9% respectively) across all age, income, race/ethnic, and regional groups.

"Now please think about the ways you accessed the Internet from someplace other than from home or from work. Did you access the Internet…"

Those who access the Internet outside of home or work only *Percent saying yes*		***…using a laptop through a wireless connection?***	***…using a cell phone or handheld device such as a Blackberry?***	***…using a computer at a public library?***
Internet Users		60%	42%	37%
Age	**18-34**	62	49	42
	35-54	60	38	30
	55 and over	53	30	39
Income	**Under $40,000**	52	33	51
	$40,000 to $79,999	47	34	43
	$80,000 or more	73	58	20
Race/Ethnicity	**Latino**	57	41	40
	White	65	41	28
Region	**Central Valley**	48	44	31
	San Francisco Bay Area	65	39	41
	Los Angeles	65	44	39
	Orange/San Diego Inland Empire	60	48	39

CHILDREN, SCHOOLS, AND THE INTERNET

Communication with schools is a significant driver of Internet use among parents of school-age children. About half of high school parents (53%), elementary school parents (51%), or middle school parents (49%) visit the website of their child's school often or sometimes.

"Do you ever visit the website of this child's school?"

	Elementary school parents	Middle school parents	High school parents
Yes, often	19%	23%	28%
Yes, sometimes	32	26	25
No	49	51	47

Altogether, more than half (56%) of those with children in school report visiting the website of their children's school. However, there are stark differences by race/ethnicity, with nearly three in four whites (74%) using the Internet for this purpose, compared tofour in 10 Latinos (41%). The gap is even wider between income groups—only 30 percent of those with household incomes under $40,000 visit their child's school website, compared to 84 percent of those with incomes of $80,000 or more.

"Do you ever visit the website of this child's school?"

	Parents	Income			Race/Ethnicity	
		Under $40,000	$40,000 to $80,000	$80,000 or more	Latino	White
Yes	56%	30%	63%	84%	41%	74%
No	44	70	37	16	59	26

Use of the Internet to get homework assignments increases with the child's level of schooling. Among elementary school parents, only 18 percent access their child's homework assignments via email. The rate rises to 28 percent for middle school parents and to 35 percent among high school parents.

"Do you ever receive this child's homework assignments via the Internet or email?"

	Elementary school parents	Middle school parents	High school parents
Yes, often	8%	13%	15%
Yes, sometimes	10	15	20
No	82	72	65

Altogether, 28 percent of parents with children in schooluse the Internet to obtain their child's homework assignments through email. Again, there aredivisions apparent among demographic groups. Whites (34%) report receiving their children's homework electronically much more often than do Latinos (20%). Similarly, parents with annual household incomes of $80,000 or more are nearly three times more likely than parents with household incomes of under $40,000 to use the Internet or email for a child's homework.

"Do you ever receive this child's homework assignments via the Internet or email?"

	Parents	Income			Race/Ethnicity	
		Under $40,000	$40,000 to $80,000	$80,000 or more	Latino	White
Yes	28%	15%	30%	41%	20%	34%
No	72	85	70	59	80	66

PERCEPTIONS AND ATTITUDES

KEY FINDINGS

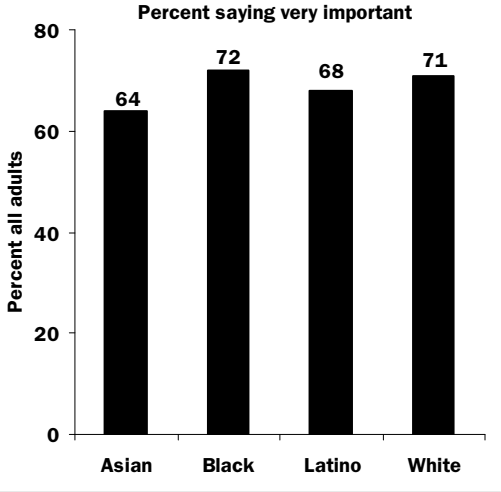
- Nearly seven in 10 Californians and strong majorities across demographic groups say it is very important for Californians to have Internet access. Most adults say the Internet is an important information source in their own daily lives, with younger, higher-income, and college-educated adults most likely to hold this view. *(page 18)*

- About two in three Californians today think that it would be a good idea for local governments to provide free wireless broadband Internet to all residents at no cost. About half say the government is doing just enough or more than enough to improve Internet access and to regulate the Internet. *(page 19)*

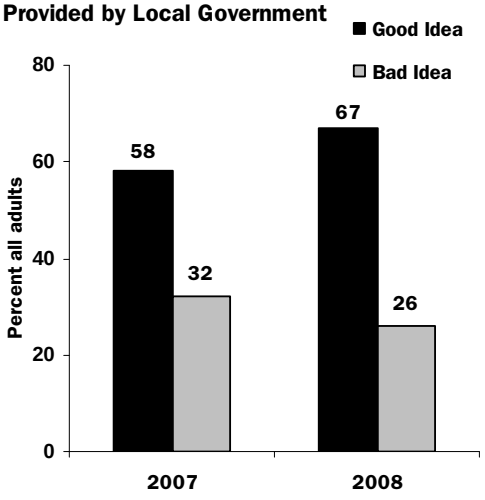
- Large majorities of Internet users say they are very comfortable with using the tools of modern information technology and getting information from the Internet. Most Internet users, however, are not very confident about keeping computer viruses out of their home computers, or that financial transactions on the Internet are secure and private. *(pages 20, 21)*

- Majorities of residents think that Californians in lower-income areas and rural areas have less access to broadband Internet technology than others, and majorities are also at least somewhat concerned about this. Awareness of this digital divide varies by income group, but not by rural status; concern varies by political group. *(pages 22, 23)*

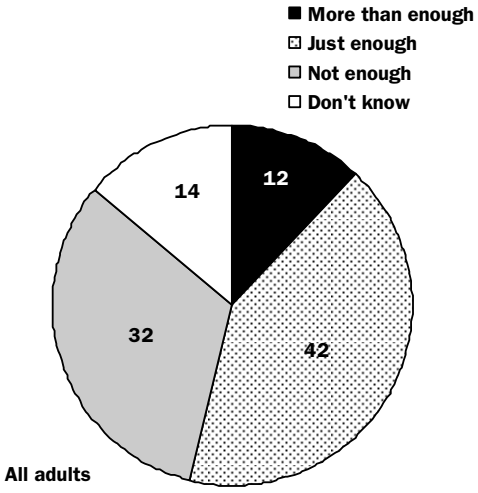
Perceived Importance of Californians Having Access to the Internet



Free Wireless Broadband Internet Provided by Local Government



Government Regulation of the Internet



PERCEPTIONS OF THE INTERNET

Nine in 10 residents say it is very important (69%) or somewhat important (21%) that Californians have Internet access, but what do they think about the role of the Internet in their own daily lives?

Half of Californians (51%) say the Internet is a very important information source, while another 29 percent say is it somewhat important, and fewer than one infive say it is not too (9%) or not at all (9%) important. The level of importance that Californians place on the Internet in their own lives rises with education and income, and decreases with older age. College graduates (61%), those with annual household incomes over $80,000 (64%), and adults under 35 (61%) are the most likely to say the Internet is very important to them as a source of information in their everyday lives. Across racial/ethnic groups, Asians (57%) are somewhat more likely than blacks (53%), whites (51%), or Latinos (50%) to say the Internet is very important as a source of information. A high value placed on the Internet as an information source is similar among urban and ruralresidents, among U.S.- and foreign-born residents, among those with children 18 years or younger and those without children, and among men and women. Nearly all Californians who use the Internet (92%) say the Internet is at least somewhat important in everyday life, and even 56 percent of those who do not use the Internet agree with this statement.

"How important is the Internet as a source of information in your everyday life?"

		Very important	Somewhat important	Not too important	Not at all important	Don't know
All Adults		51%	29%	9%	9%	2%
Age	**18-34**	61	28	7	4	-
	35-54	55	29	9	5	2
	55 and over	34	31	13	19	3
Education	**High school**	41	31	12	13	3
	Some college	56	29	8	7	-
	College graduate	61	27	7	5	-
Income	**Under $40,000**	43	30	14	11	2
	$40,000 to $79,999	51	31	9	8	1
	$80,000 or more	64	29	4	3	-
Race/Ethnicity	**Asian**	57	27	8	6	2
	Black	53	34	5	7	1
	Latino	50	29	11	9	1
	White	51	30	9	9	1
Region	**Central Valley**	48	30	10	10	2
	San Francisco Bay Area	52	31	9	7	1
	Los Angeles	53	27	9	10	1
	Orange/San Diego	48	33	9	9	1
	Inland Empire	53	28	10	8	1
Community	**Rural**	48	29	4	17	2
	Urban	51	29	10	8	2
Use Internet	**Yes**	61	31	6	2	-
	No	30	26	16	25	3

ROLE OF GOVERNMENT

With most residents saying that Internet access is important for Californians today, how do they feel about the government's role? A majority of Californians (54%) say the government is doing just enough (42%) or more than enough (12%) to regulate the Internet, while 32 percent say it is not doing enough, and 14 percent are undecided. Democrats (37%) are more likely than Republicans (28%) or independents (23%) to say that government is not doing enough to regulate the Internet.

When it comes to improving the access and availability of broadband Internet technology, a majority of Californians (51%) say the government is doing just enough (41%) or more than enough (10%), while 30 percent say it is not doing enough, and 19 percentare undecided. Findings among Internet users are similar to those of all adults.

Across parties, about four in 10 Republicans (43%), independents (40%), and Democrats (40%) say that government is doing just enough to improve broadband access, while Democrats (36%) and independents (33%) are more likely than Republicans (22%) to say government is not doing enough.

"Overall, thinking about the government's role in improving the access and availability of broadband Internet technology, do you think the government is doing more than enough, just enough, or not enough?"

	All Adults	Party			Internet Users	Likely Voters
		Dem	Rep	Ind		
More than enough	10%	7%	14%	9%	10%	11%
Just enough	41	40	43	40	43	37
Not enough	30	36	22	33	31	31
Don't know	19	17	21	18	16	21

Some local governments have considered providingfree wireless broadband Internet access to all their residents. Among Californians today, 67 percent saythis is a good idea and 26 percent say it is a bad idea. Approval for providing free wireless access hasincreased since we first asked this question in March 2007 (58% good idea, 32% bad idea). Findings among Internet users are similar to all adults. A majority of likely voters say that local government providing wireless access is a good idea.

Democrats (75%) and independents (64%) are far more likely to say local government providing Internet access to residents is a good idea. Republicans are divided (45% good idea, 48% bad idea). Latinos (83%), blacks (81%), and Asians (75%) are more likelythan whites (53%) to say it is a good idea. The belief that providing free wireless Internet accessis a good idea is strong across most demographic groups, but declines as age, income, and education increase.

"Some local governments have considered providing wireless broadband Internet access to all residents at no cost. Is it a good idea or a bad idea for local governments to provide Internet access to its residents?"

	All Adults	Party			Internet Users	Likely Voters
		Dem	Rep	Ind.		
Good idea	67%	75%	45%	64%	66%	57%
Bad idea	26	19	48	27	28	35
Don't know	7	6	7	9	6	8

COMFORT WITH TECHNOLOGY

With most Californians saying the Internet is an important information source, nearly all (93%) Internet users describe themselves as at least somewhat comfortable. Sixty-two percent of Internet users say they are very comfortable with modern informationtechnology, with even higher levels among college graduates (72%), younger residents (71%), and residents with annual household incomes of $80,000 or more (73%). By contrast, just half of high school graduates (50%) and residents age 55 and older (48%) say they are very comfortable using technology.

Strong majorities of blacks (70%), Asians (62%),whites (62%), and Latinos (58%) all report being very comfortable using modern information technology. San Francisco Bay Area (67%) and Los Angeles (66%) residents are the most likely to say they are very comfortable, followed by residents in Orange/San Diego counties (64%), the Central Valley (59%), and the Inland Empire (53%). Men are somewhat more likely than women to say they are very comfortable (65% to 59%), while Californians with children 18 or younger are similar to residents without children in saying they are very comfortable (64% to 61%). U.S.- and foreign-born residents are also similarly likely to say they are very comfortable (62% to 61%). Broadband users are far more likely than non-broadband users to say they are very comfortable using the tools of modern information technology (66% to 44%).

"Overall, how comfortable are you using the tools of modern information technology?"

Internet users only	Internet Users	Education			Age		
		High School	Some College	College Graduate	18-34	35-54	55 and above
Very comfortable	62%	50%	59%	72%	71%	63%	48%
Somewhat comfortable	31	40	33	23	26	30	38
Not too comfortable	5	8	6	3	2	6	9
Not at all comfortable	1	1	1	2	-	1	4
Don't know	1	1	1	-	1	-	1

Ninety-five percent of Internet users say they are very (70%) or somewhat comfortable (25%) using the Internet to get the information they need. Few Internetusers say they are not too comfortable (3%) or not at all comfortable (1%). Men and women, and U.S.- and foreign-born residents report similarly high levels of comfort with using the Internet. Californians with children 18 or younger (73%) are somewhat more likely than residents without children under 18 (68%) to report they are very comfortable using the Internet. Comfort increases with higher income and education. Three in four broadband users (75%) say they are very comfortable using the Internet while just half of non-broadband users (50%) say so.

"Overall, how comfortable are you using the Internet to get the information needed in your everyday life?"

Internet users only	Internet users	Income			Gender	
		Under $40,000	$40,000-$79,999	$80,000 or more	Men	Women
Very comfortable	70%	59%	67%	82%	71%	69%
Somewhat comfortable	25	34	26	16	24	25
Not too comfortable	3	3	5	2	3	3
Not at all comfortable	1	2	2	-	1	1
Don't know	1	2	-	-	1	2

CONFIDENCE IN TECHNOLOGY

While California Internet users report very high levels of comfort with using technology and the Internet, they are not as confident in their abilities to keep computer viruses, spyware, and adware out of their home computers. About seven in 10 say they are at least somewhat confident that they can do so when they want to, but only 32 percent say they are very confident about doing so.

Residents with at least some college education report higher levels of confidence than high school graduates in keeping things like computer viruses,spyware, and adware out of their home computers, while across age groups, Internet users under age 35 report the greatest levels of confidence. Across racial/ethnic groups, blacks (37%) and whites (35%) are more confident than Asians (29%) and Latinos (24%). Across demographic groups, men (35%) are somewhat more likely than women (29%), Californians without children (34%) are somewhat more likely than residents with children 18 or under (29%), and U.S.-born residents (34%) are somewhat more likely than foreign-born residents (27%) to say they are very confident about keeping things likecomputer viruses, spyware, and adware off their computers.

"Overall, how confident are you that you can keep things like computer viruses, spyware, and adware off of your home computer when you want to?"

Internet users only	Internet Users	Education			Age		
		High school	Some college	College graduate	18-34	35-54	55 and above
Very confident	32%	25%	37%	34%	37%	29%	30%
Somewhat confident	41	38	43	41	38	41	44
Not too confident	17	22	12	17	16	20	15
Not at all confident	8	12	6	7	8	9	8
Don't know	2	3	2	1	1	1	3

When asked about the security and privacy of financial transactions on the Internet, 69 percent of California Internet users are at least somewhat confident that financial transactions on the Internet are secure and private, but just 26 percent say they are very confident. Confidence in the security and privacy of these transactions is highest among residents with household incomes of $80,000 or more and among college graduates. Lower-income residents are twice as likely as upper-income residents to say they are very confident (40% to 20%). Men (29%) are somewhat more likely than women (23%) to say they are very confident about the security of online financial transactions. Across racial/ethnic groups, whites (29%) are the most likely to say theyare very confident, followed by blacks (26%), Asians (22%), and Latinos (21%). Broadband users (30%) are significantly more likely than non-broadband users (11%) to say they are very confident about the security of online financial transactions.

"How confident are you that financial transactions on the Internet are secure and private?"

Internet users only	Internet users	Income			Gender	
		Under $40,000	$40,000-$79,999	$80,000 or more	Men	Women
Very confident	26%	19%	26%	33%	29%	23%
Somewhat confident	43	38	42	46	43	42
Not too confident	16	20	18	13	14	19
Not at all confident	13	20	12	7	12	14
Don't know	2	3	2	1	2	2

ACCESS IN LOWER-INCOME AREAS

Two-thirds of Californians (65%) think that those in lower-income areas of the state are less likely than others to have access to broadband Internet technology, while 27 percent think they are no less likely to have access. The belief that residents in lower-income areas have less access to broadband Internet technology is highest for those with household income of $80,000 or more. Findings are similar in urban and rural communities.

Among racial/ethnic groups, whites (68%), blacks (65%), and Latinos (63%) are similarly likely to say that Californians in lower-income areas are less likely than others to have broadband access, while Asians (57%) are somewhat less likely to agree. Across regions, at least six in 10 in the San Francisco Bay Area (68%), Central Valley (66%), Los Angeles (65%), and Orange/San Diego counties (61%) say there is an inequality in broadband access for lower-income residents, while Inland Empire residents (57%) are least likely to agree. Broadband users (69%) more than non-broadband users (59%) think that Californians in lower-income areas are less likely to have broadband Internet access.

"Do you think that Californians in lower-income areas are less likely than others to have access to broadband Internet technology, or not?"

	All Adults	Household Income			Community	
		Under $40,000	$40,000 to $79,999	$80,000 or more	Rural	Urban
Yes, less likely	65%	64%	62%	71%	63%	65%
No, not less likely	27	29	31	23	26	28
Don't know	8	7	7	6	11	7

Six in 10 Californians (62%) are at least somewhat concerned that Californians in lower-income areas are less likely than others to have access to broadband Internet technology, and 23 percent say they are very concerned. Across political parties, Democrats (32%) are the most likely to say they are very concerned, followed by independents (22%) and Republicans (13%). Findings are similar across income groups. Levels of concern about unequal broadband access are also similar among rural and urban residents.

Across racial/ethnic groups, blacks (35%) are much more likely than others to say they are very concerned that Californians in lower-income areas are less likely than others to have broadband access. Among the 65 percent of residents who think Californians in lower-income areas have less access, seven in 10 say they are very (30%) or somewhat concerned (42%).

"How concerned are you that Californians in lower-income areas are less likely than others to have access to broadband Internet technology?"

	All Adults	Party			Community	
		Dem	Rep	Ind	Rural	Urban
Very concerned	23%	32%	13%	22%	21%	23%
Somewhat concerned	39	41	34	43	36	39
Not too concerned	19	14	25	20	17	19
Not at all concerned	15	10	24	13	23	15
Don't know	4	3	4	2	3	4

ACCESS IN RURAL AREAS

A majority of Californians (55%) think that those in rural areas are less likely to have access to broadband Internet technology. Thirty percent think they are no less likely. Across the state, Californians in rural areas and urban residents are similar in their belief that rural residents have less broadband access (58% to 55%). This belief increases with highereducation and income and declines with higher age.

Residents of the San Francisco Bay Area (58%) and the Central Valley (57%) are the most likely to think Californians in rural areas have less broadband Internet access, with Inland Empire residents (51%) the least likely. Men are somewhat more likely than women to say rural areas have less broadband access (58% to 53%). Findings among U.S.- and foreign-born residents are similar (56% to 54%).

"Do you think that Californians in rural areas are less likely than others to have access to broadband Internet technology, or not?"

	All Adults	Household Income			Community	
		Under $40,000	$40,000 to $79,999	$80,000 or more	Rural	Urban
Yes, less likely	55%	52%	55%	64%	58%	55%
No, not less likely	30	32	33	24	26	30
Don't know	15	16	12	12	16	15

Half of Californians (51%) are at least somewhat concerned that rural residents are less likely to have broadband access; 14 percent say they are very concerned. Across parties, Democrats (19%) are the most likely to say they are very concerned, with Republicans the most likely to say they are not at all concerned (24%). Findings are similar across rural and urban communities.

Across racial/ethnic groups, blacks (20%) are the most likely to say they are very concerned, while whites (13%) and Asians (14%) are the least likely. Findings among men and women are similar. Concern decreases with increases in age. Among the 55 percent of residents who think rural Californians are less likely to have broadband access, six in 10 say they are very (20%) or somewhat concerned (43%).

"How concerned are you that Californians in rural areas are less likely than others to have access to broadband Internet technology?"

	All Adults	Party			Community	
		Dem	Rep	Ind	Rural	Urban
Very concerned	14%	19%	9%	12%	12%	15%
Somewhat concerned	37	40	32	36	36	37
Not too concerned	24	23	31	30	24	24
Not at all concerned	19	15	24	18	22	19
Don't know	6	3	4	4	6	5

REGIONAL MAP

METHODOLOGY

The PPIC Statewide Survey is directed by Mark Baldassare, president and CEO and survey director at the Public Policy Institute of California, with assistance from Dean Bonner, project manager for this survey, survey research associates Jennifer Paluch and Sonja Petek, and survey intern Nicole Fox. This is the first in a series of surveys conducted with funding from the California Emerging Technology Fund (CETF) and ZeroDivide as part of a five-year project on public opinion and information technology issues. We benefited from discussions with the CETF leadership and other experts and consultation with researchers at the Pew Internet & American Life Project and PPIC; however, the survey methods, questions, and content of the report were determined solely by Mark Baldassare and the survey staff.

Findings in this report are based on a telephone survey of 2,503 California adult residents, including 2,253 interviewed on landline telephones and 250 interviewed on cell phones. Interviewing took place on weekday nights and weekend days from June 3 to June 17, 2008. Interviews took an average of 15 minutes to complete. Landline interviews were conducted using a computer-generated random sample of telephone numbers that ensured that both listed and unlisted numbers were called. All landline telephone exchanges in California were eligible for selection and the sample telephone numbers were called as many as six times to increase the likelihood of reaching eligible households. Once a household was reached, an adult respondent (age 18 or older) was randomly chosen for interviewing using the "last birthday method" to avoid biases in age and gender.

Cell phone interviews were included in this survey to account for the growing number of residents who use cell phones. These interviews were conducted using a computer-generated random sample of cell phone numbers. All cell phone numbers with California area codes were eligible for selection and the sample telephone numbers were called as many as eight times to increase the likelihood of reaching an eligible respondent. Once a cell phone user was reached, it was verified that this person was age 18 or older, a resident of California, and in a safe place to continue the survey (i.e., not driving). Cell phone respondents were offered a small reimbursement for their time to help defray the potential cost of the call. Cell phone interviews were conducted both with adults who have only cell phone service and with those who also have a landline telephone in their households.

Landline and cell phone interviewing was conducted in English, Spanish, Chinese (Mandarin or Cantonese), Vietnamese, and Korean, according to respondents' preferences. We chose these languages because Spanish is the dominant language among non-English speaking adults in California, followed in prevalence by the three Asian languages. *Accent on Languages* translated the survey into Spanish, with assistance from Renatta DeFever. Abt SRBI Inc. translated the survey into Chinese, Vietnamese, and Korean, and conducted all interviewing.

With assistance from Abt SRBI, we used recent U.S. Census and state figures to compare the demographic characteristics of the survey sample with characteristics of California's adult population. The survey sample was closely comparable to the census and state figures. Abt SRBI used data from the 2006 National Health Interview Survey (NHIS) for the Pacific Census Division and from the January–July 2007 NHIS to estimate landline and cell phone service in California and compare it against landline and cell phone service reported in the survey. The survey data in this report were statistically weighted to account for any differences in demographics and telephone service.

The sampling error for the total sample of 2,503 adults is +/- 2 percent at the 95 percent confidence level. This means that 95 times out of 100, the results will be within 2 percentage points of what they would be if all adults in California were interviewed. The sampling error for subgroups is larger: For the 1,835 registered voters, it is +/- 2.5 percent; for the 1,295 likely voters, it is +/- 3 percent. Sampling

error is only one type of error to which surveys are subject. Results may also be affected by factors such as question wording, question order, and survey timing.

Throughout the report, we refer to five geographic regions accounting for approximately 90 percent of the state population. "Central Valley" includes Butte, Colusa, El Dorado, Fresno, Glenn, Kern, Kings, Madera, Merced, Placer, Sacramento, San Joaquin, Shasta, Stanislaus, Sutter, Tehama, Tulare, Yolo, and Yuba counties. "San Francisco Bay Area" includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties. "Los Angeles" refers to Los Angeles County, "Inland Empire" includes Riverside and San Bernardino counties, and "Orange/San Diego" refers to Orange and San Diego counties. Residents from other geographic areas are included in the results reported for all adults, registered voters, and likely voters. However, sample sizes for these less populated areas are not large enough to report separately in tables and text. In this survey, we also asked for the zip code of the residence in order to compare the responses of those living in rural areas to those living in urban areas as defined by the U.S. Census. The U.S. Census defines urban areas as generally consisting of a large central place and adjacent densely settled census blocks that together have a total population of at least 2,500 for urban clusters, or at least 50,000 for urbanized areas. Rural areas are defined as any territory not classified as urban.

We present specific results for respondents in four self-identified racial/ethnic groups: Asian, black, Latino, and non-Hispanic white. We also compare the opinions of registered Democrats, Republicans, and independents (i.e., those registered as "decline to state"). We also analyze the responses of likely voters—those who are the most likely to participate in the state's elections. In addition, we present the responses of Internet users—defined in a manner to be consistent with national surveys for comparison purposes as those who answered yes to either: "Do you ever go online to access the Internet or worldwide web or send or receive email?" or "Do you send or receive email, at least occasionally?"

We compare current PPIC Statewide Survey results to those in our earlier surveys and to those in recent surveys by the Pew Internet & American Life Project.

QUESTIONNAIRE AND RESULTS

CALIFORNIANS AND INFORMATION TECHNOLOGY

June 3–17, 2008
2,503 California Adult Residents:
English, Spanish, Chinese, Korean, and Vietnamese

MARGIN OF ERROR +/-2% AT 95% CONFIDENCE LEVEL FOR TOTAL SAMPLE

1. First, do you think things in California are generally going in the right direction or the wrong direction?

22%	right direction
69	wrong direction
9	don't know

2. Turning to economic conditions in California, do you think that during the next 12 months we will have good times financially or bad times?

15%	good times
78	bad times
7	don't know

3a. Changing topics, do you have any type of personal computer, including laptops, in your home?

72%	yes *[skip to q3e]*
28	no *[ask q3d]*

[q3b and q3c not asked]

3d. And what is the main reason you don't have a computer at home?

[code, don't read]

37%	cost
22	not interested
21	don't know how to use it
7	don't really know about computers
3	sufficient access elsewhere
3	concern about children's access
6	other
1	don't know

3e. Do you yourself ever use a computer at home, at work, or at school? (*if yes:* Do you use a computer often or only sometimes?)

58%	yes, often *[ask q4]*
16	yes, sometimes *[ask q4]*
25	no *[skip to q34]*
1	don't know *[skip to q34]*

4/4a. Do you ever go online to access the Internet or worldwide web or send or receive email? or Do you send or receive email, at least occasionally?

70%	yes
30	no/don't use a computer

[q5-q9 asked only of Internet users]

5. Did you happen to use the Internet yesterday?

78%	yes
22	no

6. About how many years have you been an Internet user?

1%	less than 1 year
26	1–5 years
42	6–10 years
21	11–15 years
8	more than 15 years
2	don't know

7. About how often do you use the Internet or email from home?

41% several times a day
25 about once a day
13 3–5 days a week
9 1–2 days a week
3 every few weeks
3 less often
6 never *(volunteered)*

8. About how often do you use the Internet or email from work?

43% several times a day
9 about once a day
5 3–5 days a week
4 1–2 days a week
1 every few weeks
5 less often
24 never *(volunteered)*
9 don't work/retired *(volunteered)*

9. About how often do you use the Internet or email from someplace other than home or work?

8% several times a day *[ask q10]*
6 about once a day *[ask q10]*
6 3–5 days a week *[ask q10]*
8 1–2 days a week *[ask q10]*
7 every few weeks *[ask q10]*
24 less often *[skip to q14]*
41 never *(volunteered) [skip to q14]*

Now please think about the ways you accessed the Internet from someplace other than from home or from work.

[q10-q12 asked only of those who accessed the Internet from somewhere other than home or work at least every few weeks]

10. Did you access the Internet using a laptop through a wireless connection?

60% yes
40 no

11. Did you access the Internet using a cell phone or handheld device such as a Blackberry?

42% yes
58 no

12. Did you access the Internet using a computer at a public library?

37% yes
63 no

[If "yes" to q10, ask q13 and q13a]

13. In the past year, have you ever used WiFi or other wireless Internet services in public places, such as airports, coffee shops or restaurants?

72% yes *[ask q13a]*
28 no *[skip to q14]*

13a. Do you mostly use free WiFi services in public areas, do you mostly use WiFi you have to pay for, or do you use a mixture of free and paid services?

55% mostly free
9 mostly pay
34 a mix
1 use other services/do not use WiFi *(volunteered)*
1 don't know

Next, please tell me if you ever use the Internet to do any of the following things?

[rotate q14-q23c]

[findings for q14-q24 reported for all adults]

14. How about going online to get news or information about politics or the 2008 campaigns?

46% yes
54 no/don't use computers or Internet

15. How about going online for information for your work or job?

49% yes
51 no/don't use computers or Internet

16. How about going online to purchase goods and services?

52% yes
48 no/don't use computers or Internet

17. How about going online to get news and information on current events, public issues, or politics?

55% yes
45 no/don't use computers or Internet

18. How about going online to use a social networking site like MySpace, Facebook or LinkedIn.com?

26% yes
74 no/don't use computers or Internet

19. How about going online to do any banking or manage your finances?

47% yes
53 no/don't use computers or Internet

20. How about going online to get health or medical information?

50% yes, do this
50 no/don't use computers or Internet

21. How about going online for your education, such as taking a college course?

27% yes, do this
73 no/don't use computers or Internet

22. How about going online to visit a state, local, or federal government website?

50% yes, do this
50 no/don't use computers or Internet

23a. How about going online to access government resources, such as obtaining forms, making payments, or registering to vote?

43% yes, do this
57 no/don't use computers or Internet

23b. How about going online to get housing or real estate information?

40% yes, do this
60 no/don't use computers or Internet

23c. How about going online to get information about activities or events in your community?

47% yes, do this
53 no/don't use computers or Internet

24. What kind of Internet connection do you have at home? Do you use a dial-up telephone line, or do you have some other type of connection, such as a DSL-enabled phone line, a cable TV modem, a wireless connection, a fiber optic connection such as FiOS or a T-1?

29% DSL-enabled phone line *[ask q25]*
19 cable modem *[ask q25]*
7 dial-up telephone line [skip to q27]
5 wireless connection (either land-based or satellite) *[ask q25]*
2 fiber optic or T-1 *[ask q25]*
1 other *(specify) [skip to q27]*
36 do not have Internet access/computer at home *[skip to q27]*
1 don't know *[skip to q27]*

[q25 and q26 asked only of broadband users]

25. What do you like most about having a high-speed Internet connection at home?

[code, don't read]

71% faster access/greater speed
11 convenience in general
3 easier to check email/communicate
2 doing job-related tasks from home/working from home
2 downloading all types of files faster
2 the "always on" connection
7 other
2 don't know

26. Thinking about your high-speed Internet service at home, do you subscribe to a basic broadband service, or do you pay extra for a premium service that promises faster speed?

58% subscribe to basic service
31 subscribe to premium service at higher price
11 don't know

[q27 asked only of those who don't have DSL, cable, fiber optic, or T1 Internet connection]

27. Do you happen to know whether high-speed Internet service is available in your neighborhood from a telephone company, a cable company or any other company?

74%	yes, available
17	no, not available
9	don't know

[q28 and q29 asked only of dial-up users]

28. Would you like to have a faster broadband connection, or isn't that something you're interested in?

30%	yes, interested
69	no, not interested
1	don't know

29. What would it take to get you to switch to broadband?

[code, don't read]

35%	lower price
6	it would have to become available where I live
3	having someone else pay for it
2	my cable/telephone company would have to offer it where I live
24	nothing will convince me to get broadband/not interested
11	other
19	don't know

[q30-q33 asked only of Internet users]

30. Overall, how comfortable are you using the tools of modern information technology?

62%	very comfortable
31	somewhat comfortable
5	not too comfortable
1	not at all comfortable
1	don't know

31. Overall, how comfortable are you using the Internet to get the information needed in your everyday life?

70%	very comfortable
25	somewhat comfortable
3	not too comfortable
1	not at all comfortable
1	don't know

[rotate q32 and q33]

32. Overall, how confident are you that you can keep things like computer viruses, spyware and adware off of your home computer when you want to?

32%	very confident
41	somewhat confident
17	not too confident
8	not at all confident
2	don't know

33. How confident are you that financial transactions on the Internet are secure and private?

26%	very confident
43	somewhat confident
16	not too confident
13	not at all confident
2	don't know

[rotate q34 and q35]

[q34-q42 asked of all adults]

34. How important do you think it is for Californians to have access to the Internet?

69%	very important
21	somewhat important
4	not too important
3	not at all important
3	don't know

35. How important is the Internet as a source of information in your every day life?

51%	very important
29	somewhat important
9	not too important
9	not at all important
2	don't know

[rotate q36 and q37]

36. Overall, thinking about the way the Internet is regulated by the government, do you think the government is doing more than enough, just enough, or not enough?

12%	more than enough
42	just enough
32	not enough
14	don't know

37. Overall, thinking about the government's role in improving the access and availability of broadband Internet technology, do you think the government is doing more than enough, just enough, or not enough?

10%	more than enough
41	just enough
30	not enough
19	don't know

[rotate blocks: q38-q39 and q40-q41]

38. Do you think that Californians in lower-income areas are less likely than others to have access to broadband Internet technology, or not?

65%	yes, less likely to have access
27	no, not less likely to have access
8	don't know

39. How concerned are you that Californians in lower-income areas are less likely than others to have access to broadband Internet technology?

23%	very concerned
39	somewhat concerned
19	not too concerned
15	not at all concerned
4	don't know

40. Do you think that Californians in rural areas are less likely than others to have access to broadband Internet technology, or not?

55%	yes, less likely to have access
30	no, not less likely to have access
15	don't know

41. How concerned are you that Californians in rural areas are less likely than others to have access to broadband Internet technology?

14%	very concerned
37	somewhat concerned
24	not too concerned
19	not at all concerned
6	don't know

42. On another topic, some local governments have considered providing wireless broadband Internet access to all residents at no cost. Is it a good idea or a bad idea for local governments to provide Internet access to its residents?

67%	good idea
26	bad idea
7	don't know

[q43 asked of those who completed survey on a landline telephone]

43. Now thinking about your telephone use, do you have a working cell phone?

75%	yes, have cell phone
25	no, do not

[q44-q45a asked of all respondents who have a cell phone]

44. Do you ever use your cell phone to send or receive text messages?

58%	yes
42	no

45. Do you ever use your cell phone to send or receive email messages?

26%	yes
74	no

45a. Do you ever use your cell phone to access the Internet?

25%	yes
75	no

46. On another topic, some people are registered to vote and others are not. Are you absolutely certain that you are registered to vote in California?

73%	yes *[ask q46a]*
26	no *[skip to q47]*
1	don't know *[skip to q47]*

46a. Are you registered as a Democrat, a Republican, another party, or as an independent?

43%	Democrat *[skip to q48]*
34	Republican *[skip to q48]*
3	another party *(specify) [skip to q48]*
20	independent *[ask q47]*

47. Do you think of yourself as closer to the Republican Party or Democratic Party?

21% Republican Party
46 Democratic Party
24 neither *(volunteered)*
9 don't know

48. Generally speaking, how much interest would you say you have in politics?

31% great deal
36 fair amount
24 only a little
8 none
1 don't know

49. Would you consider yourself to be politically:

[read list, rotate order top to bottom]

11% very liberal
19 somewhat liberal
31 middle-of-the-road
24 somewhat conservative
12 very conservative
3 don't know

[d1-d4: demographic questions]

[d5-d5h asked of parents with children 18 or under]

d5. Are any of your children in elementary school?

60% yes *[ask d5a]*
40 no *[skip to d5c]*

d5a. Do you ever visit the website of this child's school? (*if yes:* Do you do this often or only sometimes?)

19% yes, often
32 yes, sometimes
49 no

d5b. Do you ever receive this child's homework assignments via the Internet or email? (*if yes:* Do you do receive these often or only sometimes?)

8% yes, often
10 yes, sometimes
82 no

d5c. Are any of your children in middle school?

30% yes *[ask d5d]*
70 no *[skip to d5f]*

d5d. Do you ever visit the website of this child's school? (*if yes:* Do you do this often or only sometimes?)

23% yes, often
26 yes, sometimes
51 no

d5e. Do you ever receive this child's homework assignments via the Internet or email? (*if yes:* Do you do receive these often or only sometimes?)

13% yes, often
15 yes, sometimes
71 no
1 don't know

d5f. Are any of your children in high school?

37% yes *[ask d5g]*
63 no *[skip to d6]*

d5g. Do you ever visit the website of this child's school? (*if yes:* Do you do this often or only sometimes?)

28% yes, often
25 yes, sometimes
47 no

d5h. Do you ever receive this child's homework assignments via the Internet or email? (*if yes:* Do you do receive these often or only sometimes?)

15% yes, often
20 yes, sometimes
65 no

[d6-d20: demographic questions]

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PUBLIC POLICY INSTITUTE OF CALIFORNIA

BOARD OF DIRECTORS

PUBLIC POLICY INSTITUTE OF CALIFORNIA
500 Washington Street, Suite 600
San Francisco, California 94111
phone: 415.291.4400
fax: 415.291.4401

PPIC SACRAMENTO CENTER
Senator Office Building
1121 L Street, Suite 801
Sacramento, California 95814
phone: 916.440.1120
fax: 916.440.1121

www.ppic.org
survey@ppic.org

POLICY BRIEF
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In Search of Digital Equity: Assessing the Geography of Digital Divide in California[1]

by Ali Modarres

"Digital divide does not occur in a vacuum, unaffected by social processes or a social context."

Advancements in information and communication technologies (ICTs) and their growing adoption rates over the last few decades have changed how we conduct our personal communication, business activity, political advocacy, social mobilization, and information gathering. Euphoria about the role of ICTs in overcoming the obstacles of location, distance, and social class has been gradually tampered by the awareness that marginalized places and people seem to benefit unequally by the possibilities brought about by these technologies. Despite their promise, the lack of access to ICTs has been documented by a number of scholars throughout the globe, pointing to the urgency for battling the emerging patterns of digital divide.

The 2003 World Summit on the Information Society in Geneva, which was endorsed by U.N. General Assembly Resolution 56/183, brought the importance of creating a functioning and equitable information society to a world forum. At this conference, delegates from a number of countries, including nongovernmental organizations, presented their experiences and policy solutions for overcoming the emerging patterns of digital divide. The resulting declaration, *Building the Information Society: A Global Challenge in the New Millennium*,[2] identified 67 principles for moving toward such a society. This declaration was based on the logic that to create an information society, we need to overcome the emerging digital divide; and to achieve that, we need to rely on the basic principles of equitable development and social justice. As the first principle of the declaration stated, such an equitable condition cannot be created without commitment to building "a people-centred, inclusive and development-oriented Information Society."

With a focus on people, places, and sustainable development, ICTs would be able to deliver on their promise of leveling the playing field and improving the quality of life for everyone. However, without attention to the basic human condition, the simple act of making ICTs available, though necessary, was deemed inadequate for achieving the goal of creating a sustainable information society. As the 9th principle articulated,

> …ICTs should be regarded as tools and not as an end in themselves. Under favourable conditions, these technologies can be a powerful instrument, increasing productivity, generating economic growth, job creation and employability and improving the quality of life of all. They can also promote dialogue among people, nations and civilizations.

[1] This research and publication were made possible by a grant from the Community Partnership Committee through its Applied Research Initiative on access to telecommunications services in California's underserved communities with support from ZeroDivide. The Community Partnership Committee was formed by eight coalitions of 134 community-based organizations and SBC (now AT&T) to serve underserved communities throughout California after the SBC/Pacific Telesis merger in 1997.
[2] http://www.itu.int/wsis/docs/geneva/official/dop.html

The challenge for the world body, which includes us, remains the same––that digital divide is influenced by persistent and endemic structural inequities in our societies (e.g., social, economic, political, racial, and ethnic inequities). To replace digital divide with digital equity, we need to focus on the larger arenas of education, housing, community and economic development, and social justice––factors that can help us battle the forces of inequality. In this regard, ICTs should be seen as tools for advancing the cause of sustainable development and social justice.

For any region, including California, to lessen the impact of digital divide on the area's future of physical and human development, it needs targeted policies to alter the negative externalities of this phenomenon on people and places. Since the funding needed to engage in this process is hardly limitless, policymakers need to identify priority areas for phased investment and development. To that end, we have conducted a statewide spatial analysis of digital divide, attempting to document its social, economic, and demographic dimensions. These results have been used to provide a roadmap for developing particular area-based policies. This policy brief presents a summary of the findings and policy recommendations from our larger report.[3]

Summary of the Analysis and Findings

Our analysis of digital divide in California relied on a 2007 dataset (at census-tract level), acquired from a commercial data provider, Claritas, Inc.[4] This information and the employed methodologies allowed us to examine the geography of estimated access to technology, pattern, and type of usage and contextualize this information within a sociodemographic context. The dataset acquired for this research contains a large number of variables that include the following:

- Computer ownership (desktop and laptop)
- Access to landlines and cell phones
- Type of access to the Internet (e.g., dial-up, DSL, and cable modem)
- Reasons for accessing Internet (e.g., e-mail, banking, shopping, and gaming)

These variables, along with estimated 2007 sociodemographic variables, were used to create a spatial, statistical, and visual assessment of how access to technology varies across the state and within individual counties. During the first phase of the analysis, we mapped the individual variables to create a visual assessment of access to technology and how this pattern may be related to various sociodemographic indicators. To provide a better visual tool, we developed sets of 35 maps for each county, which are included in the Appendix of the larger report.[5]

This initial visual assessment was followed by a statistical analysis during the second phase, which included the creation of various indexes and a detailed examination of how geography and socioeconomic status relate to the patterns of access to technology.

Selected Findings

For the purpose of this policy brief, we will focus on only a handful of, but relevant, findings from this research. These include the following:

- Number of cell phones per household is an important predictor of socioeconomic status. While having one cell phone is negatively correlated with all other technology access indicators, it is positively correlated with percentage of Latino, Non-Hispanic African American, and Non-Hispanic Native American populations. Furthermore, while having one cell phone appears to be prevalent in low-income areas, having multiple cell phones per household is more likely to occur in areas with higher-socioeconomic status. There are at least two lessons to be learned immediately. First, in low-income areas,

[3] To access the full report, please visit: http://www.patbrowninstitute.org/
[4] In 2006, we published the results of similar research on digital divide in Los Angeles County. That report can be found at: http://www.patbrowninstitute.org/publications/documents/CTF_Report.pdf
[5] Due to its size, this Appendix is available only on CDs.

the use of cell phones is becoming more common, perhaps replacing the need for traditional landline phones. Second, while one cell phone per household may meet the minimum need of a household for communication purposes, having access to multiple phones, which improves the communication ability of multiple household members, is highly related to socioeconomic status.

This pattern of access to cell phones is of particular importance to those concerned with digital divide. Clearly, as mobile devices supplement or replace computers for accessing the Internet and the information it provides, as well as for engaging in multiple modes of communication, such as sending e-mails and text messages, it becomes crucial that policies regarding the expansion of broadband and access to ICTs include full consideration of how we may increase access to cell phones and smart phones. From a private sector perspective, this may require a reassessment of pricing plans or subscription fees.

- While the use of dial-up services to connect to the Internet rarely exceeds 25% of households in any one census tract, this type of connection remains more common in rural areas with minimal availability of cable and DSL, or where the price for these faster modes of connection is prohibitive.

  Contrary to the observed pattern of dial-up usage, cable appears to be an important choice for less economically strapped urban neighborhoods. This is similarly true for DSL services. This suggests that location is a good predictor of one's socioeconomic status as well as ability to access the infrastructural backbone and service nodes within our society.

- Areas appearing to be least connected to the Internet are mostly in rural northern California, eastern portions of Imperial, Riverside, and San Bernardino counties, as well as isolated tracts from Inyo and King to Tuolumne, Mariposa, and Amador counties. Overall, there are 252 census tracts (or 3.6% of all tracts) where 60% or more of the resident households do not have access to dial-up, cable, or DSL services. In 2007, these tracts housed over 990,000 individuals: 36.4% Non-Hispanic White, 9.8% Non-Hispanic African American, 1.3% Non-Hispanic Native American, 8.9% Non-Hispanic Asian, and 40.9% Latino.

- Among the 252 tracts, where more than 60% of the households did not have access to dial-up, cable, or DSL, 114 were estimated to have zero wirelines for at least 20% of their resident households. These tracts are located across multiple counties, including Alameda, Butte, Contra Costa, Fresno, Imperial, Los Angeles, Mendocino, Monterey, Sacramento, San Bernardino, San Diego, San Francisco, San Joaquin, San Luis Obispo, Shasta, Solano, and Stanislaus. However, 73 of them are to be found in Los Angeles County.

- E-mailing and shopping are among the top two Internet activities. Instant messaging with voice, sending videos by e-mail, downloading/purchasing music, downloading video, visiting and publishing to online communities, downloading and purchasing games, watching streaming video, engaging in multiplayer games, and watching Internet TV are among the emerging applications. Spatial pattern of usage for high-end applications suggests that it mainly appears in well-to-do neighborhoods.

- High-socioeconomic status of an area (reflected by the residence of highly-educated population and employment in professional occupations) is positively correlated with desktop and laptop ownership (slightly higher for the latter), having more than two cell phones, access to the Internet via cable and DSL, using various modes of instant messaging, e-mailing, and all other types of Internet usage. This further suggests that California's digital divide is deeply affected by the geography of socioeconomic status and its correspondence with the spatial distribution of racial and ethnic groups.

- As the Latino population in a rural census tract increases, access to cable and DSL––as well as the opportunity for using the broadband for any Internet activity––diminishes. Households in these areas are more likely to rely on a single cell phone, facing a reasonable chance of having no access or need for wirelines.

- Observed patterns of access to technology suggest that there are two types of Internet usage: (a) common applications (such as e-mailing, banking, shopping, sending pictures and videos, and playing games alone) and (b) specialized usage that requires high-speed connection (Internet videos, games, music, streaming audio, multiplayer games, visiting and publishing to community, Internet TV, and streaming video). Since the unit of analysis is a census tract, this grouping pattern suggests that not only is there a distinct geography of Internet usage but also this pattern is driven by socioeconomic status of an area, which affects its prevalent mode of connection to the Internet, the degree of need for particular applications, and cost associated with more advanced applications (and technologies).

- Using the 26 technology variables, we were able to construct a cumulative technology index by census tract (see Figure 1).[6] As Figure 1 illustrates, the following areas achieved some of the highest scores in the state: coastal regions in the Bay Area, extending from Contra Costa to Santa Clara and Marin to San Mateo counties, and in southern California, extending from Ventura to San Diego, including the southwestern region of San Bernardino and the western section of Riverside counties.

- Overall, 4,856 census tracts (or 68.9% of all tracts) achieved a mid-level score on the cumulative technology index. However, 979 census tracts appeared to have a larger level of access to technology. Among these, 404 were located in the three counties of Los Angeles, Orange, and Santa Clara. Collectively, the 979 tracts had a population of close to 6 million, which accounts for 16.2% of the total population in the state (see Table 1). Nearly half of the residents of these tracts were Non-Hispanic White, while 5.3% were Non-Hispanic African American, 18.4% were Non-Hispanic Asian American, and 22.6% were Latino. Comparing these values with the overall racial and ethnic structure of the state suggests that the population residing in tracts with the highest levels of access to technology is disproportionately Non-Hispanic White and Asian.

- While only 26 counties appear on the list of census tracts with the high scoring values on the technology index, the list for census tracts with low score values includes 53 counties (see Table 2), missing only Alpine, Marin, Mono, San Benito, and San Mateo counties. Of these, only San Benito and San Mateo show up on Table 1. This suggests that census tracts in these two counties are entirely in the high-scoring category. The other three counties have census tracts that fall entirely in the middle range for the Cumulative Technology Index.

- As Table 2 illustrates, about 39% of all tracts in this category (466 of 1,191 census tracts) fall in Los Angeles County, housing also about 39% of the 5.7 million people who live in such tracts in the state. Overall, while slightly over 30% of residents in these tracts are Non-Hispanic White, over 50% are Latino and 9% are African American, rates that are disproportionate to the racial and ethnic structure of the population in the state. This pattern is more severe at the county level. For example, in Los Angeles, only about 144,000 of the residents in the low-scoring tracts were Non-Hispanic White. This is slightly over 1% of the total population and about 5% of all Non-Hispanic White residents of the county. In contrast, these low-scoring tracts house over 1.5 million Latinos, making up 15% of the county population and about 32% of its total Latino residents.

[6] See the full report for an explanation of how this and other indexes were constructed.

Figure 1


2007 Cumulative Index
Access to Information
and Communication
Technologies
Low
To
High
Source: Claritas Inc., Computations and Mapping by A. Modarres

Toward a Policy Intervention

Our findings illustrate that the racial/ethnic dimension of the digital divide is an important concern, especially when we consider the degree to which it correlates with socioeconomic status. For a state that has attracted many immigrants and minorities over the last few decades, allowing it to become one of the most diverse places in the world, the paradox of segregation amid diversity is an ongoing challenge. In the case of digital divide, then, it should not come as a surprise that the emergent spatial patterns are strongly influenced by the geography of race and ethnicity.

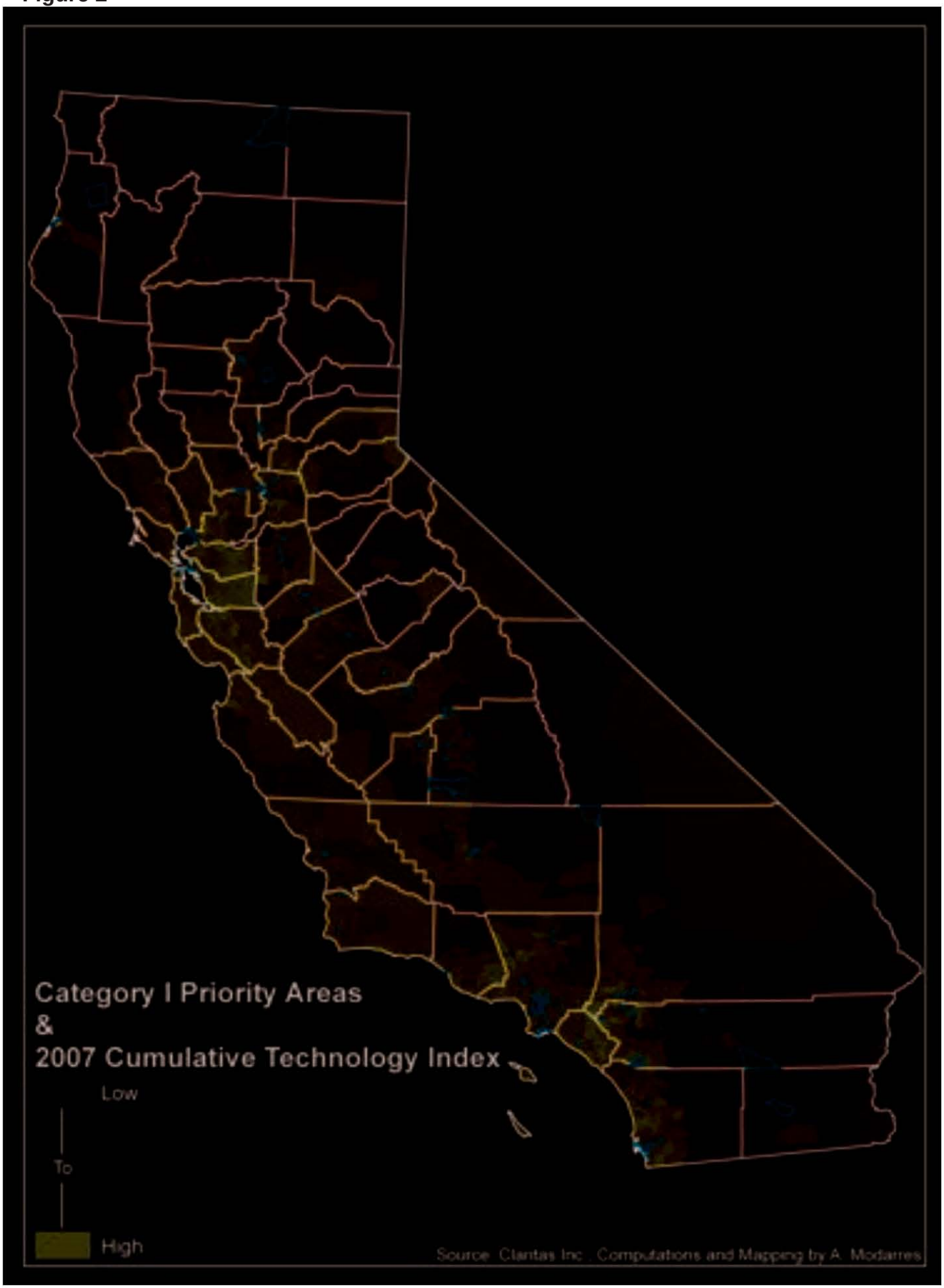
In fact, what is interesting about the state of digital divide in California is the degree to which diversity status of a census tract is related to the observed level of access to technology. As illustrated in the research report, the index of diversity was negatively correlated with Latino and Non-Hispanic White populations and positively with Non-Hispanic Asian and African American populations. This means that census tracts with a high-diversity index were more likely to house a large number of the latter groups and fewer of the former. With that information in mind, it was surprising to discover that our cumulative index of access to technology was positively correlated with the diversity index! In other words, the higher the diversity level, the more likely an area was to receive a high score for access to various technologies. Interpreting this in a positive manner, it means that in areas with a higher socioeconomic status, in which a mixture of racial and ethnic groups live together, access to technology is more prevalent. Interpreting it negatively, less diverse places, where low-income Latinos are more likely to reside, have a higher chance of experiencing low levels of access to ICTs. This means that the path to digital equity is not that different from the path to social justice. Space has become the container of our social, cultural, and economic relationships, encapsulating our structural differences and inequities.

To ameliorate these sociospatial injustices, we need to accept that (a) "place" matters, (b) places are marred by the nature of our past and present relationships and sociopolitical dynamics, and (c) places reproduce these conditions due to years of disinvestment and neglect. From a policy perspective, it means that to improve the state of digital divide, we need to understand its social, cultural, economic, and demographic underpinnings; and, we need to construct our solutions in a systematic manner that dovetails social justice efforts, economic development plans, educational reforms, and all other progressive social policies. Digital divide does not occur in a vacuum, unaffected by social processes or a social context. In fact, it would be a great mistake to assume that digital divide is merely a technological problem. The geography of digital divide, as presented by this research, suggests that to produce sustainable solutions for the existing patterns of inequitable conditions, we must deal directly with the sociospatial contexts that produce them. Without changing these contexts, a lasting change cannot occur.

Given the limited resources in the state, it is crucial that we prioritize our intervention policies based on a hierarchy that includes geographic location and socioeconomic status. Since these geographies cover both urban and rural California, the area/population prioritization needs to take a phased approach that helps some neighborhoods reach the middle range quickly and invests in low-scoring areas by building the needed physical infrastructure and human capital to achieve higher levels of connectivity in the future.

To provide one such example of an area-based prioritization, we have identified two groups of census tracts: those areas where scores for the cumulative access to technology are close to the middle range (and as such, smaller investments could bring about the needed transition more swiftly) and areas where the scores are significantly low. Based on our analysis, the first category includes 467 census tracts in the state. A significant majority of these tracts (197 or 42%) is located in Los Angeles County. Among the 467 tracts, 228 report median household incomes below $30,000, suggesting that they may need a more immediate policy intervention. As Table 3 illustrates, 27 or half of all counties in California show up on this list, including a mixture of rural and urban areas (also see Figure 2, which identifies these tracts visually). They dot counties

Figure 2


Category I Priority Areas
&
2007 Cumulative Technology Index
Low
To
High
Source: Ciantas Inc., Computations and Mapping by A. Modarres

in southern California and Imperial Valley and a chain of them appears from central to northern California, highlighting some of the more rural areas of the state.

Collectively, these 228 tracts house 1.1 million individuals, who are largely Latino (64.6%) and Non-Hispanic African American (9.5%). However, in counties such as Butte, Humboldt, San Luis Obispo, and Ventura, more than half of the resident population of these tracts is Non-Hispanic White. Counties where Latinos make up more than half of the population in the identified tracts include Fresno, Imperial, Kern, King, Los Angeles, Madera, Merced, Riverside, San Bernardino, San Diego, San Joaquin, Santa Barbara, Siskiyou, Stanislaus, and Tulare. Among these, the six counties of Los Angeles, San Diego, Kern, Riverside, Tulare, and Fresno house the largest number of Latinos (i.e., close to 83% of the Latinos in the selected 228 census tracts, or 600,000).

Based on the pattern of access to various ICTs in these tracts, a reasonable public policy approach could include the following:

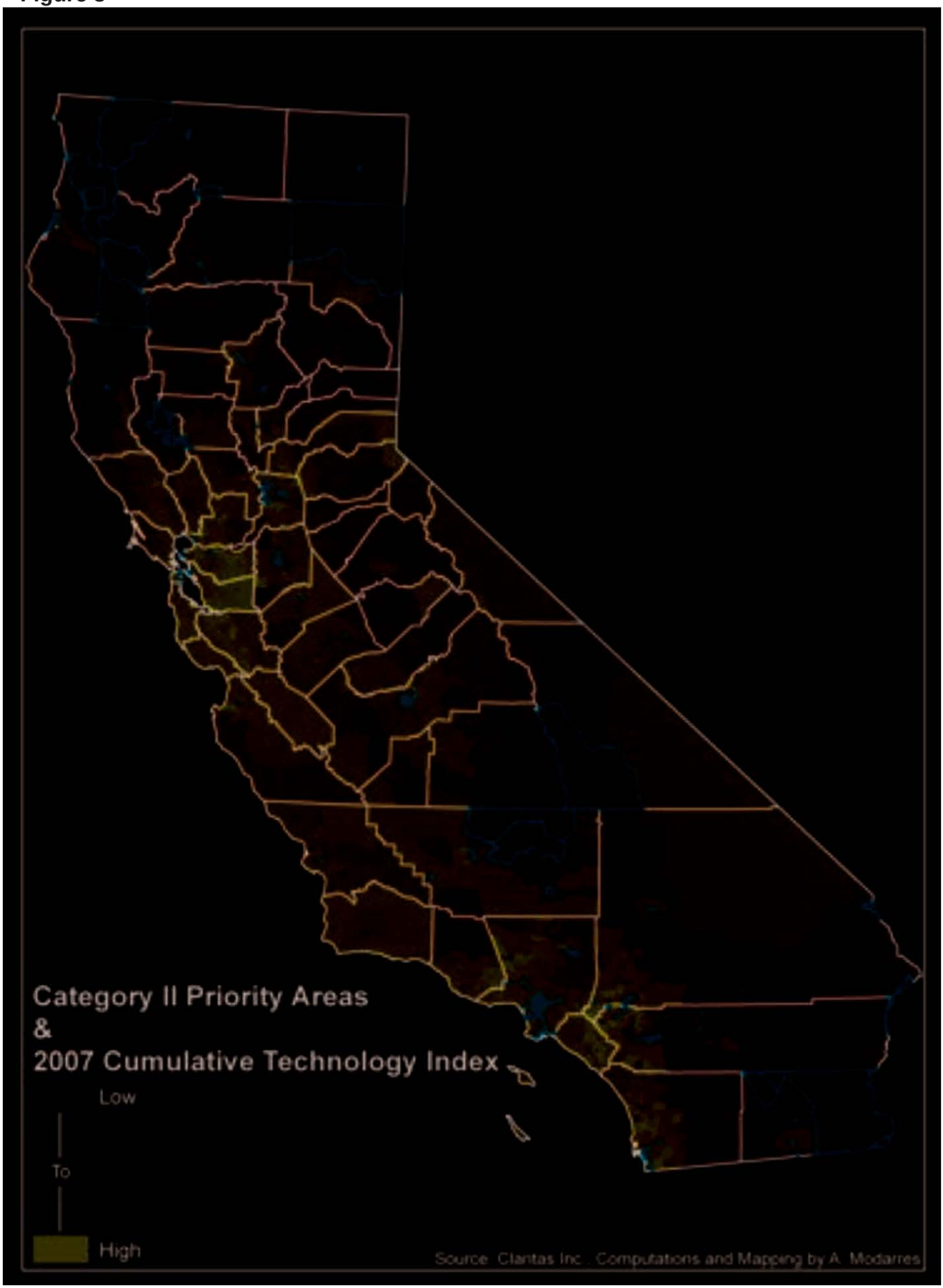
- Address infrastructural inequities to assure high-speed connectivity
- Ensure that access is not hindered by cost
- Provide educational resources regarding the use and benefits of the Internet

Additionally, it is crucial that steps are taken to expand subscription and use of cell phones in these tracts. As this study has shown, the number of cell phones per household is an important factor in the emerging patterns of digital divide. Increasing the level of access to cell phones and smart phones (i.e., more than one per household) could help us expand the level of access to the Internet in a more immediate (and perhaps) less costly manner. Through a public-private partnership, we could bring about less costly services and offer more education about how these devices can play the dual role of providing personal communication and access to digital information.

The second category of priority areas, which identifies the least connected census tracts, includes both rural and urban areas; however, as Figure 3 suggests, a larger number of these tracts is located in northern California. The 341 census tracts in this category house 1.5 million people, 56.4% of whom are Latino; 12.3%, Non-Hispanic African American; and another 17.9%, Non-Hispanic White (see Table 4). The higher representation of African Americans in this category may suggest that while Latino neighborhoods remain among the most technologically disconnected in the state, African American neighborhoods are equally and, in some cases, more drastically affected by the same phenomenon. However, since the African American population is significantly smaller and geographically concentrated (in fewer tracts) than that of Latinos, its experience with digital divide may not be as readily obvious (especially in statewide and large regional analyses). As Table 4 illustrates, the 47% of the population of Alameda County who live in census tracts that fall in the second category (i.e., the lowest level of access to almost all forms of ICTs) are Non-Hispanic African American. Similarly, 24% of the selected census tracts in Contra Costa County, 11% of Fresno, 24% of Lassen, 15% of Los Angeles, 16% of Sacramento, 16% of San Francisco, 10% of San Joaquin, and 37% of Solano are Non-Hispanic African American. Hence, focusing on these priority areas would not only improve our digital divide patterns but also take major steps toward improving the status of access in African American and Latino neighborhoods in the state.

Overall, these census tracts need a significant infrastructural and human/social capital development. This can best be achieved, perhaps, by a mixture of educational and infrastructural policies. While the latter would focus on improving access to ICTs, especially access to the broadband, the former would help enable the population to utilize these services to improve its social and economic opportunities. This would mean that in addition to the private-public partnership for making resources available, nonprofit and grassroot groups would need to be included for the full diffusion of the technology. This would also provide the needed education and community development efforts to build the social capital of these neighborhoods as their physical and economic structures are enhanced.

Figure 3


Category II Priority Areas
&
2007 Cumulative Technology Index
Low
To
High
Source: Claritas Inc., Computations and Mapping by A. Modarres

We believe that a place-based approach with an eye on social, cultural, economic, racial, and ethnic indicators can provide the best and most measurable results in overcoming the current patterns of digital divide. For that to occur, areas with minimal connection need to receive a boost in their digital infrastructure, while residents are provided with economically feasible services. However, to improve the level of access and usage in the most severely disconnected places, the strategy needs to move beyond simply making broadband and various ICTs available.

In that regard, we find ourselves in agreement with the recommendations of the World Summit on the Information Society––"ICTs should be regarded as tools and not as an end in themselves." To overcome the current patterns of digital divide, we need to prepare, improve, and cultivate the conditions that make technological products and services relevant to the life of those who have been left behind in every phase of progress and development. For that reason, we believe that digital equity needs to be made a logical and articulated component of community and economic development efforts in the least connected places. It is through the convergence of these policy arenas that we can create the conditions that will lead to an improved quality of life for all residents, enriched with sustainable use of ICTs and the benefits they can provide.[7]

[7] This report relied on data from a commercial source. As such, our analysis should be seen as an *estimation* of the state of digital divide in California. We recommend that the State fully consider a data policy for aggregating and centralizing service provider information. This will allow selected researchers (in academia or in appropriate government offices) to analyze the data regularly, providing a more reliable monitoring of our progress and allowing us to create and adjust policies that aim to diminish the negative impact of digital divide on various communities in California.

Table 1 - Areas with High Scores on Access to Technology Index

County	No. of Census Tracts	2007 Population	2007 Non-Hispanic White Population	2007 Non-Hispanic African American Population	2007 Non-Hispanic Native American Population	2007 Non-Hispanic Asian Population	2007 Non-Hispanic Pacific Islander Population	2007 Non-Hispanic Other	2007 Non-Hispanic 2 races or more	2007 Latino Population
Alameda	70	400,670	176,795	13,841	1,316	131,216	1,536	1,136	18,325	56,505
Contra Costa	32	274,740	140,262	24,018	919	43,522	1,054	697	12,725	51,543
El Dorado	2	10,856	8,733	168	23	642	25	23	329	913
Fresno	10	62,492	40,284	1,840	258	7,116	145	192	1,965	10,692
Imperial	1	3,443	1,139	19	27	218	-	7	36	1,997
Kern	12	75,856	47,020	3,233	593	4,639	122	92	1,919	18,238
Los Angeles	155	791,767	441,650	39,900	2,151	116,378	1,525	2,198	20,893	167,072
Merced	2	17,122	6,701	935	81	433	80	67	495	8,330
Monterey	10	48,706	13,920	1,162	186	5,753	146	67	1,000	26,472
Orange	101	562,006	357,754	8,559	1,300	101,670	1,043	1,073	20,033	70,574
Placer	10	78,047	61,202	1,266	384	6,230	150	151	2,709	5,955
Riverside	66	472,100	218,025	47,892	2,009	38,756	1,793	888	15,608	147,129
Sacramento	35	248,505	124,800	23,355	1,142	45,161	1,055	711	13,899	38,382
San Benito	2	20,864	9,926	290	100	918	54	38	405	9,133
San Bernardino	46	532,400	182,603	53,277	1,660	52,230	1,250	930	14,957	225,493
San Diego	90	552,151	303,579	21,122	1,451	102,769	1,947	1,082	20,014	100,187
San Francisco	69	269,115	171,492	10,247	626	43,881	505	1,030	7,724	33,610
San Joaquin	12	129,769	55,925	11,842	765	18,055	827	432	6,913	35,010
San Mateo	21	88,223	45,566	1,874	214	25,082	555	273	3,250	11,409
Santa Barbara	6	31,122	17,946	408	98	2,764	53	57	1,083	8,713
Santa Clara	148	803,165	277,532	21,754	1,941	296,543	3,126	1,794	27,641	172,834
Solano	21	131,746	50,305	20,364	516	27,718	895	336	7,519	24,093
Sonoma	3	23,981	17,851	340	114	1,759	87	36	846	2,948
Stanislaus	4	32,929	17,218	1,196	146	3,571	172	155	1,517	8,954
Ventura	48	319,112	164,822	5,471	1,177	23,728	704	501	6,675	116,034
Yolo	3	13,328	5,933	197	48	2,061	107	25	507	4,450
Total	979	5,994,215	2,958,983	314,570	19,245	1,102,813	18,956	13,991	208,987	1,356,670
Percent of Total	100.00	100.00	49.36	5.25	0.32	18.40	0.32	0.23	3.49	22.63

Source: Claritas, Inc. Computations by Ali Modarres

Table 2 - Areas with Low Scores on Access to Technology Index

County	No. of Census Tracts	2007 Population	2007 Non-Hispanic White Population	2007 Non-Hispanic African American Population	2007 Non-Hispanic Native American Population	2007 Non-Hispanic Asian Population	2007 Non-Hispanic Pacific Islander Population	2007 Non-Hispanic Other	2007 Non-Hispanic 2 races or more	2007 Latino Population
Alameda	35	111,562	9,143	47,619	410	15,239	659	253	4,172	34,067
Amador	5	23,926	21,394	78	210	251	10	22	452	1,509
Butte	29	141,761	107,602	2,254	2,384	6,693	252	257	5,664	16,655
Calaveras	4	24,837	21,125	261	367	293	21	21	657	2,092
Colusa	2	5,715	3,484	100	109	52	13	11	96	1,850
Contra Costa	9	50,169	15,119	10,722	191	3,384	273	126	1,493	18,861
Del Norte	5	22,215	16,646	120	1,364	777	12	38	869	2,389
El Dorado	4	16,849	13,918	38	233	207	19	16	573	1,845
Fresno	46	270,370	55,691	22,966	2,331	25,335	362	373	6,038	157,274
Glenn	3	12,128	8,009	141	276	559	10	14	268	2,851
Humboldt	19	95,869	74,486	1,024	5,294	1,822	180	329	4,705	8,029
Imperial	15	79,147	9,708	4,524	1,223	753	54	50	457	62,378
Inyo	5	15,205	10,235	51	1,492	175	8	21	434	2,789
Kern	32	157,242	64,212	10,040	1,841	1,580	194	197	3,432	75,746
Kings	4	25,351	7,311	771	419	412	48	18	447	15,925
Lake	9	48,615	36,584	1,218	1,145	520	66	44	1,338	7,700
Lassen	2	8,571	4,631	1,495	171	40	6	97	131	2,000
Los Angeles	466	2,196,272	144,799	303,562	6,356	172,928	5,162	3,145	30,374	1,529,946
Madera	6	39,807	15,434	535	676	238	113	134	706	21,971
Mariposa	3	16,172	13,665	140	407	163	13	18	439	1,327
Mendocino	13	63,472	45,356	426	2,375	563	110	120	1,768	12,754
Merced	10	42,169	10,156	2,133	233	4,058	41	75	903	24,570
Modoc	4	9,682	7,852	73	315	67	7	27	174	1,167
Monterey	2	11,579	3,145	2,228	79	407	81	262	222	5,155
Napa	1	5,179	2,575	21	31	87	2	3	68	2,392
Nevada	7	38,862	34,074	176	279	423	39	83	1,180	2,608
Orange	26	143,833	41,187	1,181	416	8,957	157	85	1,289	90,561
Placer	7	39,651	30,212	297	265	689	72	39	1,034	7,043
Plumas	5	19,617	17,144	179	382	137	15	32	470	1,258
Riverside	89	445,961	223,524	18,179	3,723	10,296	813	483	8,447	180,496
Sacramento	41	192,175	57,432	30,193	1,501	30,497	2,032	507	11,510	58,503
San Bernardino	45	216,185	116,917	13,393	2,083	8,804	585	373	6,824	67,206
San Diego	70	335,710	80,798	20,794	1,962	25,028	1,159	414	8,951	196,604
San Francisco	12	39,482	6,504	9,782	148	18,091	582	99	1,234	3,042
San Joaquin	28	142,559	25,887	14,479	926	21,268	299	230	4,641	74,829
San Luis Obispo	7	38,925	31,195	574	214	1,486	40	50	854	4,512
Santa Barbara	2	14,802	2,316	503	112	322	30	6	258	11,255
Santa Clara	1	328	186	7	-	72	-	-	8	55
Santa Cruz	2	14,649	2,201	85	120	326	8	25	163	11,721
Shasta	23	116,648	95,779	1,085	2,891	2,373	148	144	4,566	9,662
Sierra	1	3,427	3,017	7	46	3	3	2	43	306
Siskiyou	14	46,108	37,737	603	1,444	558	39	43	1,413	4,271
Solano	3	5,235	1,181	1,426	60	904	24	8	264	1,368
Sonoma	2	8,113	6,912	54	49	180	13	15	247	643
Stanislaus	13	60,663	22,513	2,114	558	2,315	209	104	2,032	30,818
Sutter	5	18,550	10,268	402	213	1,031	40	20	496	6,080
Tehama	10	57,427	42,164	414	941	479	38	115	1,401	11,875
Trinity	4	13,958	11,938	60	541	116	16	14	585	688
Tulare	19	94,547	21,599	1,641	1,032	3,416	154	113	1,610	64,982
Tuolumne	8	46,459	37,003	1,899	575	454	73	38	1,142	5,275
Ventura	5	13,316	8,494	156	87	384	7	13	264	3,911
Yolo	7	35,003	16,223	1,401	371	4,343	147	78	1,579	10,861
Yuba	2	11,695	7,739	156	264	973	8	14	559	1,982
Total	1,191	5,707,752	1,714,424	533,780	51,135	380,528	14,466	8,818	128,944	2,875,657
Percent of Total	100.00	100.00	30.04	9.35	0.90	6.67	0.25	0.15	2.26	50.38

Source: Claritas, Inc. Computations by Ali Modarres

Table 3 - Category I Areas for Possible Policy Intervention

County	No. of Census Tracts	2007 Population	2007 Non-Hispanic White Population	2007 Non-Hispanic African American Population	2007 Non-Hispanic Native American Population	2007 Non-Hispanic Asian Population	2007 Non-Hispanic Pacific Islander Population	2007 Non-Hispanic Other	2007 Non-Hispanic 2 races or more	2007 Latino Population
Alameda	4	9,934	1,249	3,928	68	940	68	15	430	3,236
Butte	7	30,128	20,953	872	372	1,956	108	83	1,285	4,499
Fresno	7	42,394	7,018	2,029	334	3,721	80	54	913	28,245
Humboldt	3	12,779	7,476	310	2,675	287	23	52	572	1,384
Imperial	1	2,942	495	12	13	6	-	-	21	2,395
Kern	14	73,758	11,865	7,171	573	936	60	60	1,172	51,921
Kings	2	15,075	4,196	592	111	312	32	15	262	9,555
Los Angeles	113	529,427	35,052	62,261	1,432	40,538	1,591	660	8,100	379,793
Madera	2	13,142	1,715	149	115	42	32	13	64	11,012
Merced	4	18,630	1,005	1,004	60	2,972	21	22	346	13,200
Orange	1	2,843	714	38	1	1,723	4	14	143	206
Riverside	11	65,728	12,169	3,466	455	1,254	139	53	1,195	46,997
Sacramento	5	21,490	6,410	2,615	166	4,456	129	76	1,332	6,306
San Bernardino	6	24,067	3,878	4,363	132	475	74	28	511	14,606
San Diego	15	86,018	16,071	8,019	478	4,935	341	85	3,126	52,963
San Francisco	1	5,130	1,771	1,919	10	831	9	17	230	343
San Joaquin	6	34,896	3,400	3,852	136	6,326	95	111	1,281	19,695
San Luis Obispo	1	5,802	4,490	39	17	607	8	6	152	483
Santa Barbara	2	14,802	2,316	503	112	322	30	6	258	11,255
Siskiyou	1	1,401	644	2	8	5	-	3	15	724
Solano	1	193	55	45	-	51	-	4	20	18
Stanislaus	6	28,967	7,982	683	232	970	75	34	875	18,116
Sutter	1	4,116	1,853	86	83	57	3	4	82	1,948
Tulare	9	46,686	7,697	1,091	376	1,836	62	38	669	34,917
Ventura	1	2,426	1,539	37	28	117	2	5	107	591
Yolo	3	15,919	7,268	716	151	2,990	45	19	753	3,977
Yuba	1	6,518	3,227	131	161	923	5	2	326	1,743
Total	228	1,115,211	172,508	105,933	8,299	79,588	3,036	1,479	24,240	720,128
Percent of Total	100.00	100.00	15.47	9.50	0.74	7.14	0.27	0.13	2.17	64.57

Source: Claritas, Inc. Computations by Ali Modarres

Table 4 - Category II Areas for Possible Policy Intervention

County	No. of Census Tracts	2007 Population	2007 Non-Hispanic White Population	2007 Non-Hispanic African American Population	2007 Non-Hispanic Native American Population	2007 Non-Hispanic Asian Population	2007 Non-Hispanic Pacific Islander Population	2007 Non-Hispanic Other	2007 Non-Hispanic 2 races or more	2007 Latino Population
Alameda	9	20,513	1,419	9,634	61	5,954	45	74	755	2,571
Butte	4	20,725	12,430	774	586	2,408	30	23	1,106	3,368
Contra Costa	2	6,759	1,130	1,628	13	432	18	23	173	3,342
Del Norte	1	3,849	2,779	20	177	215	2	8	197	451
Fresno	24	129,136	16,821	14,531	1,056	16,379	140	115	3,121	76,973
Humboldt	4	20,914	15,641	295	1,002	507	48	124	1,436	1,861
Imperial	7	33,900	3,869	586	1,041	413	48	21	284	27,638
Inyo	1	2,524	1,493	-	122	23	3	5	43	835
Kern	9	50,889	29,706	2,387	804	318	58	80	1,383	16,153
Lake	3	20,830	15,438	887	466	253	42	26	710	3,008
Lassen	1	5,679	2,293	1,430	66	31	4	95	31	1,729
Los Angeles	173	810,743	42,471	122,256	2,550	76,192	1,403	1,165	10,611	554,095
Mendocino	3	16,496	10,522	105	499	158	19	22	455	4,716
Merced	1	4,008	1,552	264	29	200	2	37	62	1,862
Modoc	1	3,538	2,881	8	109	37	4	15	72	412
Monterey	1	2,547	399	79	12	93	6	-	51	1,907
Orange	1	3,723	3,412	25	6	116	3	-	20	141
Riverside	19	68,114	34,778	2,983	614	1,596	125	40	1,440	26,538
Sacramento	14	67,166	15,668	10,904	598	11,103	759	141	3,931	24,062
San Bernardino	9	23,809	5,870	2,345	448	752	65	38	598	13,693
San Diego	20	92,161	7,101	5,632	251	11,103	289	97	2,017	65,671
San Francisco	8	29,050	4,470	4,758	132	16,306	535	66	872	1,911
San Joaquin	11	55,072	7,320	5,599	344	9,402	88	54	1,675	30,590
San Luis Obispo	1	3,476	2,567	67	28	177	3	16	94	524
Shasta	6	24,746	19,179	414	630	1,185	56	56	1,158	2,068
Siskiyou	3	8,491	6,629	73	689	117	5	-	337	641
Solano	1	3,275	595	1,218	23	483	16	-	167	773
Stanislaus	1	2,539	1,366	156	47	21	7	8	74	860
Sutter	1	5,072	3,024	171	59	83	26	2	122	1,585
Trinity	2	3,836	3,164	2	247	23	2	11	196	191
Total	341	1,543,580	275,987	189,231	12,709	156,080	3,851	2,362	33,191	870,169
Percent of Total	100.00	100.00	17.88	12.26	0.82	10.11	0.25	0.15	2.15	56.37

Source: Claritas, Inc. Computations by Ali Modarres

California State University, Los Angeles
5151 State University Drive
Los Angeles, CA 90032-8261

P (323) 343-3770
F (323) 343-3774

www.patbrowninstitute.com